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UNDER THE GENERAL EDITORIAL CHARGE OF
GUSTAVUS P. HEAD, M. D.
PROFESSOR OF LARYNGOLOGY AND RHINOLOGY, CHICAGO POST-GRADUATE MEDICAL SCHOOL.

VOLUME III

The Eye, Ear, Nose and Throat

EDITED BY
CASEY A. WOOD, C. M., M. D., D. C. L.
ALBERT H. ANDREWS, M. D.
GUSTAVUS P. HEAD, M. D.

DECEMBER, 1903

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The Eye

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The Nose and Throat

GUSTAVUS P. HEAD, M. D.

INTRODUCTION.

As in previous years, the Editor is confronted by such a mass of literature—such an embarrassment of ophthalmic riches—that it is a difficult task for him to choose the matter proper to this Series. Twice the space at his disposal would be insufficient for even short reviews of all the noteworthy articles and monographs on important ophthalmologic subjects that have appeared since the publication of the last volume.

Perhaps the most striking advances in this department have been made in the application of the x-rays in the treatment of ocular neoplasms and other lesions. Plastic operations on the tissues of the conjunctival sac, the treatment of diseases affecting the posterior segment of the globe, the discussion of questions relating to the full correction of myopia and the introduction of new remedies and appliances have also occupied the attention of many observers.

The Editor again wishes to acknowledge the courtesy of Dr. H. V. Würdemann in allowing him the use of those admirable abstracts so well known to readers of the *Annals of Ophthalmology*. He is also much indebted to Drs. deSchweinitz, Shumway and Todd for a number of excellent reviews of current literature contributed to the *Ophthalmic Record*. As usual, the Editor has made a few observations when these appeared desirable.

CASEY WOOD.

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THE EYE.

THE EYE.

EXAMINATION OF THE EYE.

The Normal Size of the Pupil. As the result of *examinations of the pupils in 1,000 patients* of different age, sex and refractive conditions, Tange[1] reaches the following conclusions: 1. The size of the pupil varies greatly. 2. Women have wider pupils than men. 3. The "physiological size of the pupil" decreases with age. 4. The pupil is narrower in hypermetropia than in myopia. 5. It decreases with the degree of hypermetropia. 6. It is wider in myopes up to the twentieth year, than in emmetropes. 7. In increasing age, the differences between the "physiological width" in various refractive conditions are less decided. Beyond the fortieth year, they are unimportant. 8 The color of the iris has no influence on the size of the pupil. Tange believes that the smaller pupil in hypermetropia is due to the increased normal tone of the sphincter muscle, which results from the more constant use of the accommodation. For the smaller pupil of old age he assumes a greater weakening of the dilatator muscle than of the sphincter.

Instrument for Determining the Strabismus Angle. Nelson Black[2] describes his apparatus, consisting of a wooden base supporting an upright. At right angles to the center and top of this upright is attached an arm which can be turned to the right or left at the center of the upright; on the back of this arm a scale of degrees is marked. The light is a long miniature electric lamp that can be flashed on and off with a push button. On the arm is a small marker to attract the patient's attention. The scale is made by extending the radii through the arc of the circle

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(1) Archiv f. Augenheilk, Oct., 1902.
(2) Ophthalmic Record, Nov., 1902.

to the arm which forms the tangent, the radius being 60 cm., or the distance of the patient's eye from the light.

To measure the deviation, the patient is placed in front of the apparatus with the elbows resting on the table. The distance of the eyes being regulated by a cord to which is attached a ring which is held on the little finger at the orbital margin; the light being flashed on will at once attract his attention, the position of the corneal reflex is noted in the fixing eye and the patient directed to look at the marker, which is moved to or from the upright until the reflex in the deviating eye is relatively in the same position as it was in the fixing eye when looking at the light; by directing the patient to look first at the light and then at the marker, the reflex can be located exactly in the deviating eye and the degree read off on the back of the arm opposite the position of the marker. With small children or babies, the mother or nurse holds them on the lap with the child's head between the hands; a match is lighted and held over the marker at which the baby will naturally look; this is moved back and forward, the electric light being flashed on and off from time to time until the cornea reflex is in relatively the same position in the deviating eye. The light can be flashed on and off so quickly that the child can not have time to change its gaze from the lighted match to the electric light.

Photography of the Fundus. W. Thorner,[1] Berlin, has constructed a new apparatus for photographing the fundus oculi. His photographs of the fundus of the cat represent the papilla and the vessels very well, and allow of a very exact measurement of the relative size of the bloodvessels. Thorner emphasizes the importance of this for general medicine, as the retinal vessels participate in many alterations of the vessels of the brain. Thus the changes of growth, the action of drugs, variations of temperature, electric currents, cutting or stimulation of nerves may be studied in the living animal on photographs of the background, taken at short intervals, by exact measurements of the vessels.

[If one takes the trouble to read the original article he will soon conclude that the time of *useful* fundus pho-

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(1) Berlin. Klin. Wochenschr., No. 43, 1902.

tography has not yet arrived. The ideal process will faithfully reproduce the color-tints of the ocular background and so furnish the valuable information now given by ophthalmoscopy. Prof. Dimmer, of Gratz, exhibited at the Ophthalmological Congress in 1902 another apparatus whereby gross fundus changes could be fairly well reproduced.—Ed.]

Amber Yellow Glass in the Examination and Treatment of Eyes. H. H. Seabrook[1] finds that *green best protects the eyes from heat,* but imperfectly from blue rays, and diminishes the light. Yellow, as obtained through *amber-yellow glass, gives* but little protection from the heat rays, but almost *perfect protection from the chemical rays without impairing vision,* while it corrects chromatic aberration, centrally and peripherally and softens dazzling reflections. With this lens there is less congestion, lacrimation, photophobia and pain in examined eyes than without it; it is, therefore, suitable for examination by the oblique method of lesions of the cornea, iris and ciliary body. The effect on vision was improvement in over 35 per cent, diminution in less than 5 per cent, no change in 60 per cent. Adjustment of the new color values takes place after a few moments wearing of the glasses, which have been found beneficial in asthenopia and ocular neuralgias, superficial keratitis, central and peripheral, incipient cataract, post-operative iritis, and, particularly in that class of cases having diminished vision and hyperesthesia of the retina, as occurs with glaucoma or tobacco amblyopia, relieving the irritation caused by light and improving vision. The author believes that "selected light," not necessarily yellow, may prove of service in summer conjunctivitis, in which there is photophobia with lacrimation. The irritation seems to be kept up by various forms of dust, or by bright light, but it is by no means sure that the heat rays are not a contributing cause. Amber yellow glasses are well worth trying for these eyes.

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(1) **Medical News, Aug. 22, 1903.**

COLOR SENSE AND COLOR-BLINDNESS.

The Color Sense and Color-Blindness in Children. R. Roselli[1] found, in examining the color sense of 100 children, that the younger the child—provided it can express its sensations—the more readily is color-blindness detected. Recognition of colors in children is, of course, in direct proportion to the development of their intelligence; the more intelligent the child the more readily are colors recognized. *The color sense develops earlier and more perfectly in girls than in boys.* The former distinguish colors much better than boys and cases of color-blindness are less frequent among them. It was found that of the 100 cases examined, the boys distinguished red better than any other color, and in many instances they recognized this color when they were unable to distinguish any other. After red, purple was the most easily distinguished. Many of the boys could distinguish red, purple or violet, but not green. All the children in whom color-blindness was noted at first, became in time able to recognize and distinguish colors after appropriate exercises. He concludes, therefore, that true color-blindness does not exist in children, but merely a lack of color recognition owing to lack of exercise from ignorance of the color sense. This is also Favre's opinion. Roselli concludes that color-blindness in adults, when it is not acquired, is due solely to absolute lack of exercise in discriminating between colors, which entails in time (non-congenital) atrophy of the various nerve fibrils for the primary colors and hence an optic impotence for colors.

A practical *lantern-test for color-blindness* is described by Kenneth Scott.[2] As only four colors are ordinarily used when signaling with lights, the colors in the lantern are similarly limited; and when the examiner is satisfied that these can be quickly and correctly recognized in a practical manner, there can be no hesitation in stating that the individual under question is perfectly qualified, in this special particular, for employment in any vocation. The colors referred to are a bright white or clear yellow, red, green, and violet. Artificial illumination is used so as to

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(1) Annali di Ottalmologia, 32, 1903.
(2) Med. Press and Circular, Dec., 1902.

simulate more closely the actual working conditions, and the various colored glasses are interposed in front of it, a piece of frosted glass also being introduced among the colored ones for the purpose of confusion.

A disc, in which these glasses are mounted, revolves, in front of an aperture, on the ordinary shield screening the ophthalmoscopic lamp, or on an asbestos or other chimney specially used for the purpose; there are five round apertures, of about 10-15 mm. diameter each, at regular intervals near the margin of the disc; one of these is unoccupied, and the other four are each filled by a piece of red, green, violet (or purple) and plain frosted glass. The degree of illumination coming through the aperture, can be modified by the use of an iris-diaphragm, or by the intervention of another separate disc, revolving on the same axis as the previous one, and with a series of holes pierced in it, ranging from 1-6 mm. or larger, in diameter. Another piece of frosted glass, mounted on a separate small arm, and placed so as to work on the same axis as these two discs, can be combined with any of the other glasses in order to still further modify or diminish the intensity of the rays of light which pass through. There is no need to change the distance at which the test-lamp is placed during the examination, to obtain the alteration which would occur in the light if it were seen under actual working conditions at a far distance, as the color-test offers variations which are sufficient for this purpose.

When the foregoing means are not available, a simple and almost equally practical, and similarly accurate, method for arriving at a proper conclusion as to the power of color discrimination is to employ a series of rounded pieces of paper, 35-40 mm. in diameter, of the same colors as the lights—pale yellow, red, green, and violet; these are placed on a dark background which has a dull surface. These are mounted on a board, at each end of which are eyelets, so that it can be suspended from either end, or, by using both eyelets, it may be placed with either of its sides uppermost. This yields endless variation and change in the relative positions to each other of the colors; consequently their sequence cannot become committed to memory or learned by rote through frequent repetition, thus maintaining a sufficient and proper standard of unfamiliarity in the test. This possibility of completely and instantly transforming the appearance of the chart, also allows of the colors being indicated by name in the first instance, if deemed necessary, to the individual under examination, as it does not at all detract from its intrinsic value; this, too, may be done when using the color-test lamp. It is by no means an unknown fact that candidates have failed to pass in an examination, simply and entirely from insufficient knowledge, or even complete ignorance, of the *names* of the different colors, although at the same time being fully competent to otherwise distinguish, and unerringly recognize them.

[Eldridge-Green also believes in the necessity for the use of *color names* in a test for color-blindness. He predicted that if these were ignored in the British Board of Trade tests many candidates for employment at sea and on railways, although normal-sighted, would be rejected. Such proved to be the case. One year over 38 per cent and more than 42 per cent another year were found to have been incorrectly tested.—ED.]

REFRACTION. AMETROPIA AND ITS TREATMENT.

Skiascopy as a Method of Precision. Edward Jackson[1] reminds us that many points must be attended to if we would render skiascopy a method of precision, and so interdependent are they, each losing most of its value when not used in connection with the others, that it seems proper to recognize a special form of the shadow-test as exact skiascopy. This we can do while fully appreciating that in essential theory and general character it is identical with the shadow-test in general. He would indicate by the term *exact skiascopy:* The working at a distance of one-quarter to one-half meter. The accurate measurement of the distance. The adaptation of the source of light and the sight hole to this distance. Care to bring the source of light close to the conjugate focus of the retina. Means of fixing exactly the direction of the principal meridians.

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(1) Journal Am. Med. Assn., Sept. 15, 1903.

Control testing, by departure both ways from the lens, strength, focal distance, or meridian fixed on. And, in general, precision and exactness in every detail.

Such a method of examination is capable of sufficient accuracy for ordinary practical purposes. It will fix the error of refraction within one-quarter diopter, and in many eyes within one-eighth diopter, and the direction of astigmatism within 5 degrees when the astigmatism amounts to 0.75 D. or over, and within 15 degrees when it is only 0.25 D.

In recognizing the fact that skiascopy will not determine the refraction of all eyes with equal accuracy, it must be remembered that this is true of all methods of measuring refraction, and most true of those that give the most exact results, especially the subjective test with trial lenses and test letters.

It is not admitted that skiascopy is in this respect inferior to other methods. As a matter of fact, it can be relied *on more completely than any other method now in use.*

Decentering of lenses for near work is ably discussed by Geo. C. Savage[1]. He says that the ideal position of lenses when there is perfect muscle adjustment of the eyes, is such that the visual axes may cut their optical centers, and that the planes of the lenses may be parallel with the equatorial planes of the eyes. When the visual axes cut the optical centers of the lenses there can be no prismatic effect; and when the plane of the lens is parallel with the equatorial plane of the eye there can be no cylindrical effect.

1. If there is orthophoria, presbyopic lenses should be properly centered, that is, they should be so placed that each visual axis will cut the optical center of its lens, when a point of fixation is in the extended median plane of the head.

2. If there is uncomplicated esophoria, both presbyopic lenses should be decentered directly out, and to an equal extent, so that the two visual axes may cut the lenses to the nasal side of their optical centers, thus favoring the weak externi. This can be accomplished equally as well

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(1) Journal Am. Med. Assn., Nov. 22, 1902.

by making the frames wider than called for by the pupillary measurement.

3. In esophoria complicated only by hyperphoria of one eye and cataphoria of the other, the decentering of presbyopic lenses should be confined to the lens for the hyperphoric eye, and should be down and out, so as to develop a compensating eso-hypertropia of this eye.

4. In esophoria, complicated by hyperphoria of one eye and cataphoria of the other, with plus cyclophoria, the decentering of presbyopic lenses should be confined strictly to the lens for the hyperphoric eye, and should be down-and-out, so as to develop a compensating eso-hypertropia.

5. In simple exophoria each presbyopic lens should be decentered directly in and to an equal extent, or what would be the same in effect, the frames should be made narrower than would be indicated by the pupillary measurement.

6. In exophoria complicated by hyperphoria of one eye and cataphoria of the other, the decentering of presbyopic lenses should be confined to the one for the cataphoric eye, and should be in-and-up.

7. In exophoria complicated by hyperphoria of one eye and cataphoria of the other, with plus cyclophoria, the decentering of the presbyopic lenses should be confined strictly to the one for the cataphoric eye, and should be in-and-up.

8. In hyperphoria of one eye and cataphoria of the other, with or without plus cyclophoria, the decentering of presbyopic lenses should be confined to the one for the hyperphoric eye, and should be directly down.

9. In double hyperphoria uncomplicated, both presbyopic lenses should be decentered directly down, and to an equal extent; or, what would be the same in effect, the nose-bridge should be made deep enough to allow the visual axes to cut the lenses above their optical centers.

10. In double cataphoria uncomplicated, if any decentering should be done at all it should be directly up.

11. If there is plus cyclophoria only, in a presbyopic case, both correcting lenses should be decentered down. The maximum vertical prismatic effect should be placed at one degree, certainly not more than two degrees, and the maximum lateral prismatic effect should be placed at

two degrees, certainly not more than four degrees. In the greater number of cases the prismatic effect should correct about one-half the manifest error, but in some cases a full correction, especially of a small vertical error, may be given.

Prisms and decentered lenses interfere with some of the visual judgments and therefore are objectionable. For this reason it is better to cure muscle errors of low degree by proper prismatic exercise. Muscle errors of high degree should be treated surgically.

The full correction of myopia is a subject that has received much attention both here and in Europe and numerous articles have appeared (by Widmark, Friedmann, Risley and others) discussing it. Edward Jackson[1] reviews the whole matter and says that one should remember that the tendency of myopia to increase is not the only thing about it that needs to be combatted. All cases are, at some stage of their history, progressive. This increase is closely related to those degenerative changes that constitute its other chief dangers.

The greatest service that can be rendered a myope is to permanently check the tendency to increase of refraction; the next service of importance is to remove, in large measure, the disability myopia causes, *i. e.,* enable him to see approximately as an emmetrope.

For the great mass of myopes both of these services are rendered, by fully correcting their myopia and instructing them to wear their correcting lenses for both distant and near vision.

A report is made of 62 cases, including 123 eyes, which have been followed and carefully remeasured after periods varying from 3 to 17 years, the average being 5 2/3 years.

Of these 123 eyes, 93 have remained without change in the amount of their myopia, or the increase or diminution in the myopia has been less than 0.50 D. In 10 eyes the myopia increased 0.50 D. In 3 eyes the myopia diminished 0.50 D. In 13 eyes the myopia increased more than 0.50 D., the average increase being 1.50 D. In 4

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(1) Ophthalmic Record, Nov., 1902.

eyes the myopia diminished more than 0.50 D., the average diminution being 1. D. The percentages are:

Stationary	75.6 per cent.
Increased	18.7 per cent.
Diminished	5.7 per cent.

In but 6 eyes of the whole series was the acuteness of vision diminished to even the slightest extent; and in none of these cases did the loss amount to more than the perception of one line of letters, as from 4-4ths to 4-5ths. On the other hand there was marked improvement of the visual acuteness of 16 eyes, under the constant wearing of correcting glasses; and for some eyes the acuteness of vision was doubled.

The efficiency of full correction for rendering myopia non-progressive is most noticeable when applied to young myopes as a statistical table of 35 eyes of patients all under 20 years of age shows.

It will be noticed that these patients remained under observation for periods varying from 3 to 11 years, the average being 6 years. Of these 35 eyes, 60 per cent never became more myopic after beginning to wear correcting glasses; and while in 14 eyes the myopia at some time increased more than 0.25 D., in 4 eyes it diminished more than that amount. In nearly all of the cases that showed any increase of myopia there were periods when it remained stationary. Then after some special strain the myopia would become progressive, and would continue so until it was re-corrected, when it would again become stationary. The writer knows of no statistics as extensive as these that can be said to point to an essentially different conclusion. The most important cause of myopia appears to be the pressure on the globe of the extraocular muscles. This is greatly increased by use of the eyes for near work, and the uncorrected myope can use his eyes for nothing else. To permit and encourage the comfortable use of the eyes for distant vision, is the first indication to be met in the treatment of myopia. It is met by the constant wearing of the full correction, and in no other way. This theoretical consideration is fully supported by all published experience, and until opposing experience of quite a different order from any now extant has been brought before us, we are justified in holding that this point in the treatment of myopia has been settled. There are exceptions to the rule of full correction, but they do not detract from the great importance of the rule.

Commencement of and Progress of Myopia, and the Influence of Full Correction. Seggel[1] contributes an article on this subject, based upon an analysis of 2070 myopes. Among these 451 had their myopia fully corrected. His conclusions, which contain practically everything of value in this communication, are as follows: He is a firm believer in hygienic measures for the arrest of myopia, and by this is meant of course eye hygiene. School hygiene is of especial importance in preserving good vision and in setting narrow bounds to the myopia. To a somewhat less degree it controls the progress of myopia or at least it makes the transition to the high grades (the destructive forms) less likely, unless it has its origin in a congenital form of the affection. In the sixteenth year too great a tax on the eyes should be avoided, since at this time of life myopia is apt to be acquired. In the case of girls especially the working hours should be shorter. In individuals under 20 years of age with myopia greater than 1.25 D., if the accommodation range is good, full correction is always advisable, that is, up to 10 D., with the vision under 2/3. If the accommodation is in any degree at fault full correction is injurious. In cases of insufficiency of the interni, full correction should be given and prisms employed.

Progressive myopia, according to Liebreich,[2] is usually the result of an increase of the interpupillary distance due, primarily, to a too great separation of the inner orbital walls. This malformation of the osseous structure, he says, is the essential hereditary element of myopia, which gives rise to a disturbance of the relations between accommodation and convergence by an increase of the angle B. Therefore he considers *prisms,* combined necessarily with other precautions as to light, position, etc., as the only positive remedies against the progress of the condition. In the prodromal stage of myopia he uses only weak prisms. In more advanced cases he adds concave lenses. He believes that

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(1) Archiv für Ophthalmologie, 56, 3, 1903.

(2) Annales d'Oculistique, Nov., 1902.

the total correction of myopia succeeds only in those cases in which the angle B is either small or normal. Conversely, he thinks that the convergent squint of myopia is due to a diminution of the angle.

Rapid Operative Treatment of High Grade Myopia. D. Basso's[1] technic includes preliminary discission of the crystalline lens, an incision in the upper part of the cornea, 6 mm. in length, and extraction of the lens. The eye must be thoroughly under the influence of atropin for several days previous to the operation. General narcosis is inadvisable as it is important to have the intelligent co-operation of the patient, and to avoid pressure from the fixation forceps while the extraction is being done. He has in this way treated seven patients, and claims for his method the advantages of a much shorter course of treatment than by other plans, a smaller number of operations and the elimination of secondary cataract and its complications. He generally restricts it to patients between 15 and 30; under this age general narcosis is necessary, while over 30 discissions might be difficult in the case of hard nucleus. If there is even partial fluidity of the vitreous operative treatment is contraindicated. It is applicable only to cases in which the parts are sound and the myopia has not yet caused changes in the vitreous. The large number of cases of detachment of the retina that have followed various operations for myopia is due to the fact that the indicacations have not been limited within strictly scientific bounds. *The conditions of the vitreous should be the guide* in deciding whether or not the operation is indicated. Myopia rapidly developing to a high degree should not be operated on as it is especially in these cases that the vitreous becomes disorganized early. Any operative method which is accompanied by or displaces any of the vitreous mass is liable to produce conditions predisposing to detachment of the retina, and the absence of pressure in extraction of the lens is one of the most favorable features of his technic. Even in cases in which the vitreous unexpectedly proves to be partially fluid, the opening made by the writer is so minute that very little fluid escapes, although special care is necessary in these cases.

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(1) Annali di Ottalmologia, 32, 6, 1903.

The cocainization of the eye must be perfect, and if necessary renewed, repeatedly. The blade of a Knapp knife needle is inserted through the pupil at the outer end of the horizontal meridian, and using this point for a fulcrum, the lens is cut up and down again and again, then across until the lens, especially the nucleus, is reduced to fragments. This instrument is then laid aside and a linear incision made in the cornea, 6 mm. long, 2 mm. from the margin of the cornea, perpendicular to its vertical meridian. It is advisable to use an instrument with a blade whose cutting edge is no longer than 6 mm. The blade is then slowly withdrawn, pressing down with it the upper lip of the wound, through which a certain portion of the lens escapes while at the same time the pupil is not interfered with. Forceps and speculum are now laid aside, and the patient is allowed to rest for a few moments. A drop of cocain is then instilled, and the operator proceeds to the extraction of the lens. Opening the lids with the fingers and telling the patient to look down, a Daviel scoop is introduced into the pupil, pressing down with the back of the spoon the upper margin of the pupil. The substance of the lens is then scooped up *in* the spoon, as it were, and finds its way out through the groove in the instrument. The duration of this maneuver is largely determined by the ability of the patient to hold his eye quiet and to look in the direction imposed.

The Daviel spoon is inserted three times, allowing a brief rest between each act during which the closed lids are bathed with some warm application. A fresh spoon is taken each time. The instrument should rest on the iris at a tangent to the plane of the pupil, and when first introduced should be passed into the broken up mass of the lens, but after the first time this should be avoided, for fear of rupturing the posterior capsule. By these means the greater portion of the crystalline is removed, especially the nuclear portion. The equatorial portion may remain *in situ,* as well as possibly, a few layers of the posterior cortical part. The eye is then bandaged and kept under the influence of atropin. The patient stays in bed for the first 24 hours. The anterior chamber will then be found to be deep, the pupil dilated and both filled with lenticular remains. The reaction to the operation is trifling and the rest of the lens matter is rapidly absorbed. In two weeks the pupil is generally almost unobstructed and the patient commences to enjoy the benefits of the operation. If the extraction has been insufficient the anterior chamber will be full of cataractous fragments, and there may be pain and pericorneal injection. In this case the wound in the cornea should be opened, not later than the third or fourth day, before cicatrization has commenced, and the masses filling the anterior chamber removed. Owing to extensive laceration of the anterior capsule, absorption proceeds rapidly and generally without the formation of a secondary cataract. The cure is complete in eight or nine weeks, or even less. It is possible, however, that secondary cataract may occur as a late process just as after an operation for senile cataract.

Axenfeld[1] calls attention to the *danger of late detachment of the retina, after removal of the lens in high myopia,* especially when discission of the posterior capsule, or after cataract, is required. He believes that in operating, that method should be adopted which obviates the necessity of subsequent discission. Where the primary extraction of the transparent lens is attempted, he suggests the use of the capsule forceps instead of a free discission of the anterior capsule, as experience has taught that after cataracts come less frequently when the anterior capsule is removed than when a simple cystotomy is done. Those who do discission by Fukala's method should endeavor to make large openings in the anterior capsule, which subsequently will not so easily be closed. Axenfeld is accustomed to making a subconjunctival vertical discission of the capsule, at the first operation, extending from the upper to the lower edge of the dilated pupil. If swelling of the lens occurs too rapidly and the intraocular tension rises, he evacuates the lens by a corneal incision, but makes a free discission of the lateral portions of the capsule, at the same time. If the swelling is less rapid he makes a horizontal opening in the capsule, several days later. He thus secures broad openings, and controls the amount of swelling of the lens, so that secondary glaucoma rarely occurs. More than one linear extraction is never necessary, and a

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(1) Klin. Monatsbl. f. Augenheilk., Jan., 1903.

subsequent discission of after cataract has not been required during the two years that he has operated in this manner.

Pflüger[1] agrees with Axenfeld that the method which obviates the necessity for late discission for after cataract in myopia operations should be the surgeon's choice. He prefers discission of the transparent lens and subsequent linear extraction of the swelling lens, to extraction of the transparent lens. The discission is always made subconjunctivally, and care is taken to prevent the evacuation of the anterior chamber, as the quantitative and qualitative alteration of the solid constituents of the aqueous, after exacuation of the chamber, may make it chemically irritating to the iris, and lead to inflammatory reaction.

HYGIENE OF THE EYE.

The Eyesight and Hearing of School Children. Principally owing to the exertions of Dr. Frank Allport, of Chicago, the State Board of Health of Illinois, as well as an increasing number of boards in other States, has adopted a *systematic examination of the scholars in the public schools.* It is recommended that the eyes and ears of every pupil be examined once a year by the school teachers. The examination recommended is practical and simple in manner, and is very easily carried out in about five minutes of time. The teacher asks ten questions, and, although unable to specify the character of the child's affection, is able to discover that a defect exists. The remainder of the investigation must be entrusted to a physician. The parents are then notified by a card of warning, stating that an eye or ear defect is believed to exist, and they are earnestly requested that the matter be attended to, as it retards school progress and militates against the well-being of the child. Action by the parent is not compulsory, but parents are not likely to disregard this advice, and they are at liberty to consult any physician they desire. The following is the plan of examination recommended, and it seems one which is very likely to attain the object in view:

The State Board of Health begs to append herewith a

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(1) Klin. Monatsbl. f. Augenheilk., Feb., 1903.

brief description of the method by which the tests may be satisfactorily performed.

The necessary material simply consists in the testing charts, which may be inexpensively obtained of dealers in optical supplies, and the warning cards for parents, which will be later described, and which should be printed in your own city.

The testing charts are made of thick cardboard, partially broken at about the lower third. Above the partially broken line are printed various letters of different sizes, which should be seen by a normal eye, at certain stated distances. For instance, the large, top letter should be seen at 200 feet, the line marked 50, at 50 feet, the line marked 20, at 20 feet, etc. The line marked 20 is the one usually employed in testing eyes, therefore during the test the pupil should sit 20 feet from the card.

The teacher should completely break the card at the partially broken line, the upper part should be hung on the wall during the tests; the lower part contains the teacher's instructions for testing, etc., which are as follows:

"Do not expose the card except when in use, as familiarity with its face leads children to learn the letters 'by heart.' "

First grade children need not be examined.

The examination should be made privately and singly in a room apart from the general school session.

Children already wearing glasses should be treated with such glasses properly adjusted on the face.

Ascertain if the pupil habitually suffers from inflamed lids or eyes.

Place the testing card on the wall in a good light; do not allow the face of the card to be covered with glass.

The line marked xx (20) should be seen at 20 feet, therefore place the pupil 20 feet from the card.

Each eye should be examined separately.

Hold a card over one eye while the other is being examined. Do not press upon the covered eye, as the pressure might induce an incorrect examination.

Have the pupil begin at the top of the test card and read aloud as far as he can, first using one eye and then the other.

If the pupil does not habitually suffer from inflamed lids or eyes, he can read a *majority* of the xx (20) test type with each eye, and does not, upon inquiry, complain of *habitually* tired, painful eyes and headache after study, his eyes may be considered satisfactory. But, if he habitually suffers from inflamed lids or eyes or cannot read *a majority* of the xx (20) test type with both eyes, or habitually complains of tired or painful eyes or headache after study, a card of information should be sent to the parent or guardian.

"FACTS TO BE ASCERTAINED."

1. Does the pupil habitually suffer from inflamed lids or eyes?
2. Does the pupil fail to read a majority of the letters in the number xx (20) line of the Snellen's Test Types, with either eye?
3. Do the eyes and head habitually grow weary and painful after study?
4. Is the pupil probably "cross-eyed?"
5. Does the pupil complain of earache in either ear?
6. Does matter (pus) or a foul odor proceed from either ear?
7. Does the pupil fail to hear an ordinary voice at 20 feet in a quiet room?
8. Does the pupil fail to hear the tick of a good-sized watch at three feet with either ear in a quiet room?
9. Does the pupil fail to breathe properly through either nostril?
10. Is the pupil an habitual "mouth-breather?"

If an affirmative answer is found to *any* of these questions, the pupil should be given a card or letter of warning to be handed to the parent, which should read something like this: "After due consideration it is believed that your child has some Eye-Ear disease, for which your family physician or a physician who makes a specialty of diseases of the eye or ear should be consulted.

"It is earnestly requested that this matter be not neglected, as children with Eye-Ear diseases cannot attain the best results in school."

Either the word "Eye" or "Ear" may here be crossed out as may be appropriate for the case. If the pupil has presumably both an Eye and Ear disease, *both* words may be left and the space between the words "Eye" and "Ear" should be filled in with the word "and."

It will be observed that these cards are non-obligatory in their nature. They do not require anything of the parent, who is at perfect liberty to take notice of the warning card or not, as he sees fit. They simply warn the parent that a probable eye or ear disease exists, thus placing the responsibility upon the parent.

The "Facts to be Ascertained" have been so worded that an affirmative answer to any of them will indicate that the pupil needs a warning card to take to the parent.

One important matter should be remembered in these tests, viz.: They are not conducted solely for the purpose of detecting ocular conditions *requiring the use of glasses.* Many seem to have the idea that they simply detect errors of refraction, but such is not the case, as they will if properly carried out, detect the existence of almost all serious ocular diseases. Of course, the teacher does not know what disease may be found under an oculist's examination, but she will know that *something is wrong,* which is sufficient. The sole idea of the tests is to separate those children having good eyes and ears from those having defective eyes and ears. Those passing the tests successfully are returned to school and not re-examined for one year, when they should undergo another examination, as morbid conditions may have developed meanwhile. Those having defective eyes and ears are simply given a card of warning which they hand to the parent. This card merely states that some eye or ear disease is believed to exist, and the consulting of a physician, therefore, is advised. The matter is not compulsory, as the parent may do as he thinks best; he may consult any physician or dispensary he chooses. In this way the duty is thrown upon the shoulders of the parent, where it belongs, but, if compliance with the advice is neglected, the teacher may from time to time urge the matter with tact and delicacy, but nothing should be said to make parents regard the request as an arbitrary command.

It is urged that records of the tests should be kept on file in the various schools and that the tests should be made of *all pupils every October.*

[Every physician in this country should assist in the good cause by urging upon his town and State the great necessity for the examination of the two organs that are most directly involved in the education of school children. —Ed.]

BACTERIOLOGY.

The Micro-Organisms Found in the Conjunctival Sac and in the Various Forms of Conjunctivitis, is a subject exhaustively treated by G. Corsini[1], Parma. The conclusions arrived at are:

1. The microscopic examination of the conjunctival secretion is of great value in diagnosis and in some cases is necessary to determine the precise character of a conjunctivitis. When the results obtained are unsatisfactory doubts may almost always be cleared up by a further study of cultures in various media made directly from the conjunctival exudates.
2. The bacteriologic report is a sure means of classifying the affection; many cases of conjunctivitis which present all the clinical data necessary to place them in one class or another, when studied from the bacteriologic standpoint, often represent attenuated cases of a conjunctivitis due to quite a different pathogenic agent, which, in a condition of greater virulence, would have produced an exudation of a very grave and deleterious nature.
3. The microscopic examination is not equally satisfactory or easy in all forms of conjunctivitis. Fortunately it is comparatively certain in the usual examples catarrhal conjunctivitis. It is not difficult to deal with diplobacilli, streptococci and staphylococci; in the case of the pneumococcus and of the pseudo-diphtheritic forms special care and some patience are required.

Conjunctivitis Due to the Influenza Bacillus. Zur Nedden[2] has confirmed Jundell's observations on conjunctivitis occurring during epidemics of influenza. He investigated thirteen cases, ten of which were children in the first two years of life. The condition was a well characterized,

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(1) Translated by Casey Wood for the Ophthalmic Record, Oct., 1902.

(2) Klin. Monatsbl. f. Augenheilk., March, 1903.

light, or moderately severe inflammation, which involved chiefly the conjunctiva of the lids and transition folds, and was cured by treatment with nitrate of silver and mild antiseptic lotions, without affecting the eyeball. In ten cases the influenza bacillus was found practically alone; in three it was associated with the pneumococcus, but was the predominant organism. In five cases the eyes were primarily involved; with the conjunctivitis, appearing either simultaneously or secondarily, there was an associated bronchitis, dacryocystitis, rhinitis or otitis media, so that the conjunctivitis can not be looked upon as a simple matter, as far as the general organism is concerned. He disagrees, however, very positively with Jundell's conclusions as to the identity of the influenza bacillus and the Koch-Weeks bacillus. Morphologically, in smears from the conjunctiva, the influenza bacilli appear as very short, plump rods, almost like cocci, whereas the Koch-Weeks bacillus is a very small, slender rod. Moreover, it is exceedingly difficult to obtain cultures of the Koch-Weeks bacillus, while the influenza bacillus grows readily on artificial media, especially when it contains blood, and the small, homogeneous, dewdrop colonies retain their original, slightly elevated appearance, even after the medium has become dry. The Koch-Weeks bacillus, in addition, has never been found in the bronchi.

The *role of toxins in producing inflammations of the eye* was the subject of many experiments during the year, by Robt. L. Randolph.[1] The writer gives the results of these experiments which show that pathogenic bacteria, even those for which toxins had not previously been satisfactorily demonstrated, do harm through the action of specific soluble poisons. His conclusions are: 1. Bacterial toxins, so far as tested, when instilled even for many hours into the healthy conjunctival sac were found incapable of producing inflammation or causing other injury. 2. The same toxins when injected into the tissue of the conjunctiva or into the anterior chamber invariably set up local inflammation, the extent and intensity of the inflammation varying to some degree, according to the species of bacterium yielding the toxin. 3. Bacteria which have not previously been proven

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(1) Am. Jour. Med. Sciences, Nov., 1902.

to produce soluble toxins were found to produce them even in young cultures, and it is suggested that injections of bacterial filtrates into the eye, particularly into the conjunctival tissue, constitute a more delicate biologic test for the detection of certain toxins than the tests usually employed for this purpose. 4. The experiments recorded in this paper furnish additional examples, in a comparatively new field, of the importance of toxins in explaining the pathogenic action of bacteria, and likewise emphasize the etiologic significance of injuries of the covering membrane of the eye in favoring the actions of toxins and of bacteria.

[The Editor has already commented, in an editorial in the Journal of the American Medical Association, on this work of Randolph's, considering it to rank among the most important of the past decade. In considering the actions of bacteria, benign and pathogenic, we have hitherto largely lost sight of the damage done by their secretions and excretions, and have often failed, in consequence, to find an explanation of certain morbid processes, now easily explained.]

Panophthalmitis from infection with the micrococcus lanceolatus without a perforating wound of the eyeball is recorded by John E. Weeks.[1] The patient was 17 years of age. Both microscopic and cultural examinations by Geo. S. Dixon clearly demonstrated the active agent to be the micrococcus lanceolatus.

In this case there was an indefinite history of a blow on the eyes which was received from five to six days before the patient presented himself at the infirmary, but a close inspection of the globe and of the conjunctiva showed no abrasion whatever and at the time of examining the patient at the dispensary the young man did not remember having received an injury to the eye. There was no appearance of disease of the nasal passages or nasopharynx, no pneumonia or la grippe. The infection in this case apparently proceeded from within, but the focus from which the microorganisms were derived was undiscoverable. The case seems to me to be one of extreme interest. It shows the possibility of infection from within in cases of slight contusion which

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(1) Ophthalmic Record, Feb., 1903.

probably reduce the vitality of the tissues, also the possibility of the entrance of micro-organisms into the circulation through lesions too small to be visible.

The Chalazion Bacillus and Its Relation to the Korynea Bacteria. Hala[1] asserts: 1. Chalazion is etiologically an infectious bacterial process. 2. The numerous bacilli which are constantly found in a beginning chalazion are identical with the *Korynea bacteria*—the xerosis bacilli described by Kuschbert, Neisser and Leber. 3. The xerosis bacilli, which are found in the normal and particularly in the pathologic conjunctival sac enter the conjunctival tissue by the friction of the eyelids forming an acute purulent infection which later becomes a chronic granular tumor. 4. Predisposing factors are catarrhal affections of the conjuntiva and all kinds of asthenopia. 5. Contrary to the opinion of Baumgarten and others who do not attribute any virulent character to the xerosis bacillus, is the fact that we can produce experimentally a chalazion on the lids of rabbits by xerosis bacilli. 6. New xerosis bacilli can be obtained from the cultures of experimentally produced bacilli and their properties will remain unchanged. 7. In conclusion he states that the chalazion is not a retention cyst caused by obstruction of the excretory ducts of the Meibomian gland. 8. The chalazion has no relation whatsoever to tuberculosis.

THE EYELIDS.

Improvement in the Technic of Symblepharon Operations forms one of the most important chapters in ophthalmic operations during the past year. For satisfactory treatment of extensive adhesions of the lids to the globe, associated often with a shrunken or obliterated cul-de-sac, we are especially indebted to the labors of Weeks, Hotz and H. W. Woodruff. The last-named surgeon[2] quotes the experience of Knapp, who says that "in spite of the numerous attempts which, during the last twenty-five years, have been made to remedy this unfortunate condition by grafting skin or mucous membrane of all possible localities and in all possible manners on the atrophic surfaces, I have not

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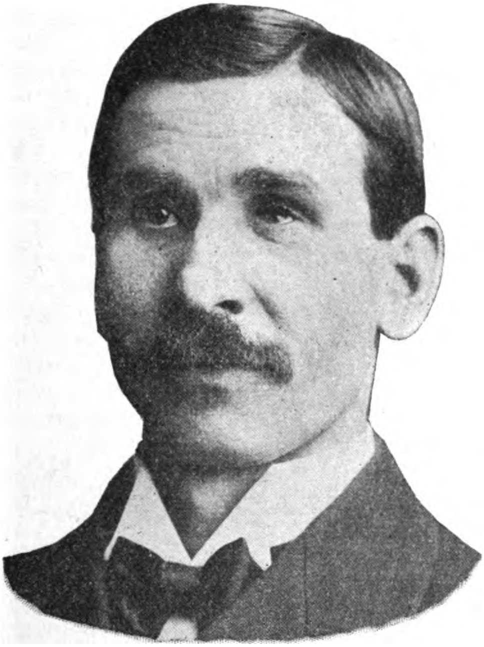
(1) Wien med. Presse, July 5, 1903.
(2) Annals of Ophthalmology, April, 1903.

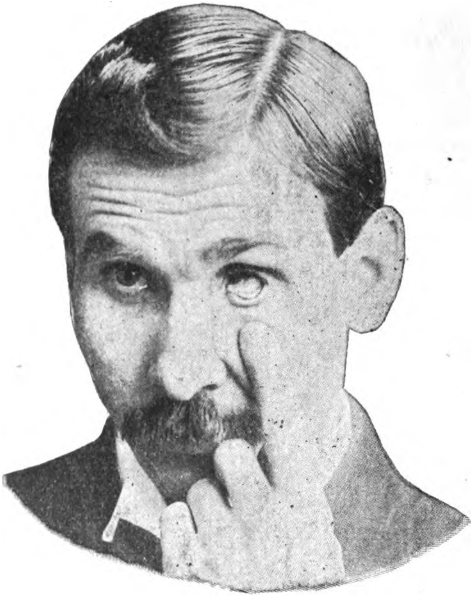
seen either in New York or in my travels a single case that had been more than a temporary improvement, including even the cases in which the object aimed at was only to fit a stump for the prothesis of an artificial eye."

The operation done by Woodruff is carried out under a general anesthetic, and consists of transplanting a large Wolffe or Thiersch graft to the denuded surface, the transplanted skin being held in place by a piece of block tin, cut and moulded to the desired shape and size. The field of operation, as well as the graft, must be carefully cleansed and every aseptic precaution proper to these operations should be strictly observed. If a pseudopterygium is present, it is first dissected from the cornea, and the lid thoroughly freed from its attachment to the eyeball, and the



Woodruff's method.
Fig. 1. Showing artificial eye worn over graft.

cul-de-sac is made large in all dimensions. Cicatricial bands should be removed entirely. Bleeding is checked by hot water. A plate is now cut from a sheet of block tin, which will snugly fit into the new-formed cul-de-sac. The corners are rounded off and the edges smoothed with the scissors or file. If the case be one of symblepharon, and there is danger of the plates rubbing on the cornea, it may be cut out in the center to the extent required. Four holes are made for the sutures, two at the outer and two at the inner angle of the plate, to correspond to the lid margin. A razor which is known to be in good condition is used for removing a thin layer of skin, about one-third wider and more than three times as long as the plate. In the Thiersch method the transplanted flap includes only the epidermis and superficial layer of the dermis. The graft is best taken from the inner surface of the arm, which is



Woodruff's method.
Fig. 2. Showing graft ten months' old.

put on the stretch by firm pressure with the hand, and made flat by pressure with the razor while cutting. The graft is transferred at once to the plate, and folded over it with the raw surfaces external. Plate and graft are then pushed into the cul de sac, and sutured to the lid near its margin, tying them over small rolls of gauze. The lids may be sewed together and dressed with gauze, and bandaged in the usual way. Both eyes should be bandaged as long as the plate is in place and absolute quiet maintained. The writer has operated on six cases, all successfully. He advises that the razor should be very sharp and long. The needles also must be as sharp as if to be used for an advancement operation, so that they will readily puncture the graft and lid with as little pressure as possible. The graft should be placed at once upon the plate, and smoothed out as well as possible while still moist, as it dries rapidly and tends to curl upon itself. The particular advantages claimed for the use of the plate over any other method of skin grafting are: 1. It enables one to place the graft at once in the position wanted. 2. It holds it down in the very bottom of the artificial cul-de-sac until it has adhered, so that the raw surfaces of the lid and ball in no part can again unite with each other in this angle, and even when the graft lives gradually push it upward, as, in my experience, it does, unless the plate is used. 3. We secure with the plate accurate approximation and rest.

[The Editor has employed on several cases of nearly total symblepharon both the Weeks method and the Hotz-Woodruff procedure just described. He believes them to be the first effective and reliable operations devised for the restoration of the cul-de-sac. Both operations are undoubtedly permanent and useful additions to surgical ophthalmology.]

Symblepharon following Gonorrhœal Ophthalmia is recorded by Leeser.[1] It resembled the so-called pseudopterygium, but differed from the usual form that follows acute blenorrhea in that, in the latter form, we have a more or less extensive conjunctival fold springing from the eyeball bordering on the limbus and attached generally very fast to a point in this location. One can readily pass a

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(1) Centralbl. f. pkt. Augenheilk., March, 1903.

probe under the fold. The condition described by Leeser differs from the above in that the point of origin and the point of attachment at the cornea were not in the usual location. The conjunctival fold was attached to the cornea, it is true, but at the same distance from the border of the cornea and the central end of this fold reached up to the pupillary area. This fold did not spring from the conjunctiva bordering on the limbus but from a point far above, in other words, from a point where the conjunctiva of the tarsus and that of the upper transition fold pass into one another. This deviation in the picture from the usual pseudo-pterygium suggests naturally a different origin. The case was operated upon and the corneal cloud which remained did not cause any very marked disturbance in vision. When the mass was separated from the cornea it sprang back suddenly under the upper lid and could not be seen with the eye wide open. It finally shrivelled up and disappeared.

Expression of the Lid Margin as a Therapeutic Measure in Blepharitis and Its Complications is advocated by Percy Friedenberg.[1] The writer calls attention to the hair follicles and glands of the margins of diseased and inflamed lids as a source of infection of an abraded cornea, or even of one whose epithelium is, to all appearances intact. Retention of pus and the growth of bacteria in this locality account for some cases of stubborn and recurrent blepharitis, and for affections of neighboring tissues, notably of the cornea, exposed as it is to actual inoculation by winking or in rubbing the eyes.

Expression of the lid margin has been used before cataract operation, in apparently healthy lids, as a measure of asepsis, to complete mechanical cleansing. Its use as a therapeutic procedure is not mentioned in text books and appears to be little known. Two cases of obstinate blepharitis, one with recurrent superficial keratitis, are cited; both were cured by this procedure. The writer refers to other cases in which, however, expression was not the only treatment used. It is not recommended to take the place of the usual and generally necessary methods (correction of ametropia and muscular imbalance, regulation

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(1) New York Medical Journal, Mar. 7, 1903.

of diet, local applications, etc.), but as a valuable and generally neglected aid.

[The Editor has for many years past employed and recommended *digital massage* as the most effective means of removing infective material from the lid edges and conjunctical sac, and, at the same time, applying medicaments (particularly ointments) to these parts. Indeed, he has long regarded the procedure as the best *single* means of treating subacute and chronic external diseases of the eye. He is greatly pleased to notice signs of a revival of this ancient and valuable remedy.]

CONJUNCTIVA.

Treatment of Purulent Ophthalmia by Concentrated Solutions of Potassium Permanganate. Viau[1] employs a one to ten per cent strength solution of potassium permanganate in purulent conjunctivitis, applying it to the lids by means of a cotton applicator. When the lids cannot be raised, the applicator is forced between the eyelids and the globe, into the cul de sac. His percentage of cures in fifty-three grave cases was one hundred.

The following advantages are claimed by him: 1. Rapidity of cure. 2. Innocuousness of concentrated solutions on the cornea. 3. Applications are less painful than those of silver nitrate. 4. The drug does not aggravate the diphtheritic form of conjunctivitis when the diagnosis is uncertain in the beginning, while silver produces considerable disturbance.

Vernal Conjunctivitis. Terson[2] reviews the literature of this affection and makes the following personal observations. Either the corneal or the tarsal types exist largely to the exclusion of the other. In his series, catarrh appeared at the end of Spring and the secretion was of various kinds. A unilateral case was never observed and but one in which there was an adenitis. The disease occurred principally among those subjects who lived in the country, and was most frequently found between the ages of six and fifteen years. Eighty-five per cent of the cases were males. Histological examination of the growths showed them to consist in attenuated papillomata, this finding being sup-

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(1 and 2) La Clinique Ophtalmologique, June 10, 1903.

ported by the fact that they occurred only at those sites at which papillæ are normally found. No specific bacterial origin could be determined, though the question of endoinfection was repeatedly raised. The author has found a two and a half per cent strength ointment of yellow oxid of mercury in lanolin or in "oil of vaselin" to be very efficient. Protargol, and hot and cold applications, cocain, suprarenal extract, colored glasses, and treatment of nasal affections, should all be tried. Locally, he performs partial or total excision. He considers galvanopuncture as the best destructive measure. The internal use of arsenic, as recommended by De Wecker, he has practiced most successfully.

The particular case mentioned by him, relapsed and later developed a severe attack of eczema, during which the ocular trouble disappeared. Schiele, he says, considers the condition as one of chronic eczema of the conjunctiva.

[For a complete collective report on vernal catarrh, as it appears in America, the reader is referred to W. C. Posey's exhaustive article on this subject in a recent number of the Journal of the American Medical Association.—Ed.]

A case of *vernal conjunctivitis successfully treated by x-rays* is reported by Frank Allport[1]. The patient, an

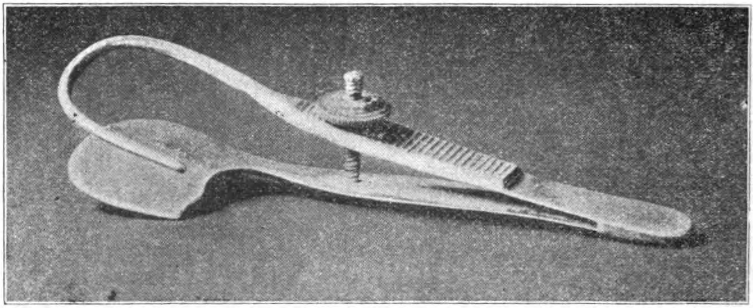

Fig. 3. Eyeball shield for x-ray treatment, the actual size of the instrument. It will be seen to be almost the same as a chalazion forceps, but the shield is larger in order to fully protect the eyeball from the effects of the x-ray. The lid is everted, and the shield of the instrument inserted between the eyeball and the lid. The upper blade is gently screwed down over the palpebral margin of the everted lid in order to maintain the eversion during the treatment. The instrument is made by Chambers, Inskeep & Co., of Chicago.

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[1] Ophthalmic Record, Nov., 1902.

anemic girl, aged 19, had had well marked attacks of the palpebral form of the disease for seven years. Large, warty, flattened, cracked epithelial masses were to be seen on both upper lids, which were covered with the characteristic milky-white exudate. The epithelial masses were removed and in the middle of June treatment by x-rays begun. W. A. Pusey and the writer devised an instrument to protect the eyeball. See the figure on previous page.

Dr. Pusey also prepared a lead mask with an elliptical opening, which was placed directly over the everted lid, so that only the remains of epithelial masses were exposed to the action of the rays.

The treatments were begun mildly and cautiously to protect the patient from possible injury, the exposures at first lasting only two or three minutes. As no harm was done, and as confidence became established, the sittings were prolonged until about ten minutes were allowed for each eye.

The patient was treated in all about eighty times, and while but little, if any, improvement could be at first observed in the diminution in size of the growths, after a while they began to disappear, and by September were practically gone, leaving in their stead smooth and apparently harmless cicatricial tissue. During the entire course of the ray treatment the patient has been perfectly free from photophobia, redness, itching, irritability, etc., the drooping lids have disappeared, the use of the eye has been resumed, and, in other words, she has passed a summer of perfect comfort, notwithstanding the fact that her treatment has been carried on during the hottest months of the year. The writer is aware of the fact that positive assertions are not actually warranted until next summer; nevertheless he believes that the case is cured, and sees no reason for believing that the growths will reappear upon soil which is now ordinary healthy cicatricial tissue. It would not be expected elsewhere in the body; why, therefore, should it appear on the lids? Whether, however, the case proves to be absolutely and permanently cured or not, of one thing we may be positively certain, the treatment this patient has received has given her a summer of perfect rest and comfort, which in itself is most desirable, and so far as the writer's experience is concerned, unprecedented, except by removal to a cold climate during the hot summer months. Pusey feels that in order to be on the safe side, the patient should have three or four weeks' treatment next spring.

Trachoma. Nicola[1] gives the details of nine cases personally observed and remarks that the findings were practically the same in twenty others. He also reviews the literature on the subject and draws the conclusion that the anatomopathologic *changes in trachoma are not directly due to any specific infection.* They are rather the result of a special reaction on the part of the lymphoid stratum of the conjunctiva to any of the ordinary causal factors of conjunctivitis, promising favorable circumstances and a predisposition on the part of the individual subject. This view may seem untenable at first glance, but it is sustained by the fact, which certainly cannot escape the observation of those who, for example, have studied an epidemic of conjunctivitis caused by the Koch-Weeks bacillus, that certain members of an infected family recover rapidly, under simple medication and with not a trace of their infection, while in others the affection displays a tenacity and resistance to the most varied and most vigorous methods of treatment, finally assuming a chronic course and terminating in the lesions characteristic of a true trachoma.

Cuprocitrol, a five or ten per cent strength mixture of citrate of copper in glycerine ointment (of the Austrian Pharmocopœa), is, von Arlt[2] tells us, a pomade which is turquoise blue in color and remains stable for one year's time when kept in glass boxes. The ointment is introduced into the conjunctival cul-de-sac on a small flattened tipped glass rod, light massage being practiced for one-half a minute through the closed lids. When the patient employs the ointment himself the material is placed only into the lower cul-de-sac. The five per cent strength ointment is first used, being applied three times a day. *Cuprocitrol is used in the same class of cases as that in which sulphate of copper is employed* and is not suitable to those cases in which there is a mixed form of disease—especially those which are accompanied by lymphatic conjunctivitis; those which are associated with marked secretion, and in advanced corneal lesions or ciliary irritation.

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(1) Annali di Ottalmologia, 5. 1902.

(2) La Clinique Ophtalmologique, July 10, 1903.

The drug is not painful, it being neither an irritant nor a caustic. It can be applied with safety by the patient. The author has collected 306 cases; of these 263 were much improved. The preparation was well tolerated in every instance.

Bock[1] analyzes fifty-eight cases of trachoma which he treated with *cuprocitrol.* He thinks the product is a valuable addition to our armamentarium, giving in fresh cases quite as good results as either nitrate of silver or blue stone. In advanced cases,especially when associated with cicatricial formation and pannus, cuprocitrol is far and away the best remedy we have, being prompt and permanent in its effects. The application of the remedy is not attended with any pain. There is no breaking down of the epithelium and the use of it does not interfere with the business of the patient. Even eyes which are irritated by its use are not at all seriously hurt. It is quite possible for the patient to conduct the treatment at home and allow the physician to inspect the eyes once a week. It is especially valuable in those sections where ophthalmologists are inaccessible. The remedy is prescribed in a five to ten per cent ointment in compressible tubes. Slight lacrimation and redness follow application, but these soon disappear. Bock employs these applications twice daily.

The use of the *x-rays in rodent ulcer and trachoma* is advocated by M. S. Mayo.[2] Chronic cases of trachoma are most suitable for treatment. The earlier it is applied the more satisfactory is the result. These patients stand more frequent exposure than any others; acute diffuse infiltrations with thickening of the lids and much photophobia require more careful exposures extending over a much longer period. Old-standing cases in which the lid trouble has almost disappeared, but in which there is much opacity of the cornea, will often improve under exposure of long intervals after the first reaction, which should be mild. The chief advantages of this treatment are: (1) there is considerably less deformity in the lid after treatment; (2) it is practically painless treatment, and (3) pannus clears more thoroughly. It is eminently suitable for hospital patients who cannot attend daily for the other methods of treatment to be carried out. In the first cases the patients were troubled with some falling out of the lashes and conjunctivitis. In no other case, out of some 15, has there been similar trouble.

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(1) Wochenschr. f. Therapie des Auges, 21, 1903.

(2) The Lancet, Feb. 28, 1903.

The Curative Treatment of Trachoma by the X-Ray and by the High Frequency Current, is the title of a paper by Stephenson and Walsh.[1] The writers comment upon the obstinacy of trachoma, especially when complicated with corneal changes, to all forms of treatment, and the superiority of surgical measures in dealing with this affection. They allude to the prior use of the x-ray tube in trachoma—a single case reported by Mayo.

Four cases of trachoma have been treated and in all of them a marked improvement was at once noted. The four patients were male children, whose ages ranged from two to twelve years. In each of them both eyes were affected with typical severe hypertrophic trachoma, the cornea being involved in three cases. Under ordinary treatment one might have been expected to cure these cases, say, in the course of eighteen months or two years.

A twelve-inch Cox's coil was used with the "Record" focus tube of the same maker. For the first few exposures the apparatus was run with a strong battery and an ordinary spring break. Afterward a Mackenzie-Davidson mercury break (of the improved form made by Cox) was substituted, together with a current run direct from the main. The focus-tube was "hard," with an average resistance equal to a seven or eight inch spark gap on the coil. The anticathode of the focus-tube was placed at an average distance of eight inches from the eye, and the average exposure was from ten to fifteen minutes. One child proved more susceptible to the action of the focus-tube than the others. After the first few exposures a mask of lead foil was used to protect the face, and so made that one or both eyes could be exposed to the tube. An average current strength of five amperes and twenty to twenty-five volts was used. In order to control results, one eye only was exposed and in one of the three the lids were held everted during the exposure. In the fourth (trachoma and pannus) both eyes

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(1) Med. Press and Circular, Feb. 18, 1903.

were exposed simultaneously to the focus-tube, and the lids of the right eye were everted. The cases were chosen from children in whom the disease was well marked and bilateral, and as nearly as possible of equal severity on the two sides.

The general results may be thus stated: Of the four cases of trachoma treated with the focus tube, the eyes appeared to be cured in two, while such considerable improvement took place in the other cases as to promise an equally favorable result with a continuance of the treatment. On several occasions a slight superficial dermatitis of the lids was noted, and in one case it amounted to a blister. The face was also similarly affected once or twice. A moderate dermatitis also occurred on the fingers and back of the hand of the nurse who held the lids everted during one of the short distance exposures (four inches). A shield and a mask of lead prevented any further mischief, so far as the hands and face were concerned.

The rapidity of the curative action is noteworthy. Every case showed an improvement from the first exposure. The immediate effect of the focus-tube was to render the granular bodies redder and more prominent. That appearance was followed by a stage during which rapid absorption of the granulations presumably took place. Out of the five eyes treated in the four patients two appear to be cured at the time of writing, while the rest of the treated eyes are well on the road to cure. On the other hand, the three eyes untreated by the focus-tube remain just as they were when the patients were first put under this special treatment, that is to say, the conjunctiva shows at the present moment severe typical trachoma.

During the focus-tube exposures the eyes not thus exposed have been treated daily with an ordinary antiseptic wash. The method of control adopted establishes the fact that the curative agency has been exposure to the focus-tube. The eversion or otherwise of the lids appears not to make the least difference in results. This is fortunate, as it is no light task for the operator or his assistant to keep a child's lids everted for ten minutes or a quarter of an hour at a time. The apparent cure of the two eyes resulted from seventeen exposures in one case, and from sixteen in another. It may safely be claimed that these results obtainable by a few weeks' treatment with the focus-tube opens up a new era for the ophthalmic surgeon, not only as regards trachoma, but other diseases of the eye as well.

The Editor[1] does not consider the Heisrath operation applicable in any of the recent or acute forms, where there is a reasonable prospect of early cure from any other form of treatment, nor, again, in the most advanced stage, in cicatricial forms which have gone on to shrinking of the sac and in which there are few or no active granulations in the tarsus, nor, finally when it is possible to remove the discrete and scattered nodules one by one.

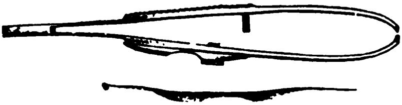

Fig. 4. Ex-section of Tarsus. Special lid forceps.

Removal of the tarsus, in part or as a whole, is indicated in those long standing cases of trachoma, not amenable to other forms of treatment, in which the lids show trachomatous infiltration, with granulation deposits in the

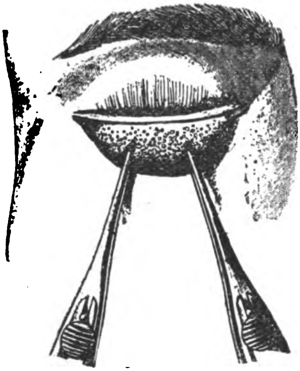

Fig. 5. Ex-section of Tarsus. Exposing the sulcus.

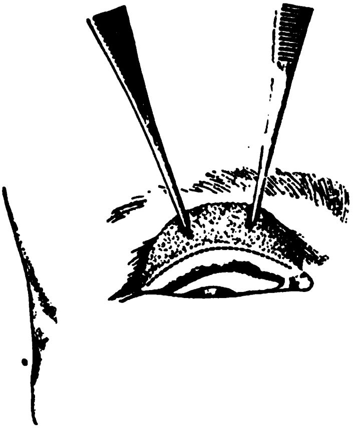

Fig. 6. Ex-section of Tarsus. First incision along the retrotarsal folds.

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(1) Casey Wood, Am. Journal of Ophthalmology, July, 1903.

fornix folds, whether the cornea be affected or not. If the tarsus itself is thickened and enlarged, if there is evident disease of the folds without apparent thickening of the tarsus, but with involvement of the cornea, or if with atrophy or cure of old granulations in the folds there remain deep seated foci in the tarsus, the operation is urgently indicated and gives gratifying results. Excision of the fornix folds does not meet the requirements in such cases, as the palpebral conjunctiva is rarely the only site of granulations, and it is quite exceptional that the tarsus and sub-mucous connective tissue escape. The Editor does not hesitate to excise the tarsus either in the presence of corneal ulcer, increasing pannus or during an acute exacerbation, removing the stitches as early as possible and keeping up constant disinfection of the eye while they are in situ. General narcosis is advisable.

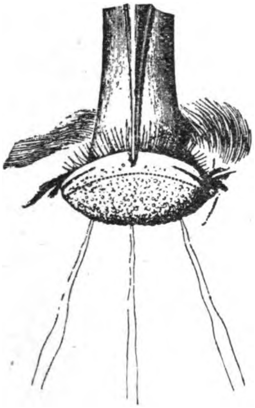

Fig. 7. Ex-section of Tarsus. Upper Sutures in position. Second incision at lid margin.

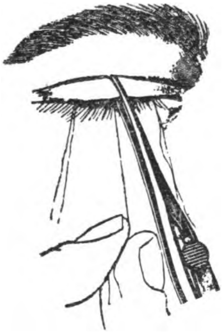

Fig. 8. Ex-section of Tarsus. Adjusting sutures at the lid margin.

The *steps of the operation* (see the diagrams, from Kuhnt's work) are as follows: The lid is everted so that the convex border of the tarsus is thoroughly exposed, grasped by two strong, toothed forceps at the junction of the middle with outer and inner thirds of the margin, and drawn firmly upward by an assistant. Following the margin of the diseased area an incision is made from the outer to the inner canthus through the conjunctiva only. Unless the conjunctiva is bound down by adhesions, the wound will gape and reveal the fibers of Müller's muscle (expansion of the levator passing to the tarsus). Three stitches are passed through the bulbar margin of the incision including only conjunctiva and a few fibers of the sub-mucosa. If more than one mm. in width of conjunctiva is included in the sutures, small symblepharon folds may form opposite each stitch, and if too deeply inserted there will be a noticeable dragging on the lid edges. The sutures are made of No. 2 black braided silk, sterilized by boiling, dehydrated in absolute alcohol, and preserved in paraffin containing 25 per cent of vaselin. The bulbar conjunctiva is now separated from the globe a distance of 3 to 5 mm. from the edge of the wound. The forceps may now be removed from the tarsus and the lid margin grasped at its middle point, a horn spatula being passed behind the everted lid. A second incision running the whole length of and parallel to the lid edge, is now made as nearly as possible in healthy conjunctiva, removing as little normal mucous membrane as possible. The tissue at the nasal junction of the two incisions is now seized and conjunctiva and tarsus excised, avoiding the orbicularis and Müller's muscle. After the bleeding has ceased, the conjunctival sac is irrigated and the lips of the wound brought together, taking care to place each suture in both wound margins so that it will be exactly opposite its fellow when the eye is closed. The bulbar conjunctiva should not be put too much on the stretch. It is advisable to allow the patient to recover from the anesthetic sufficiently to determine accurately whether the lid movements are sufficient and to be sure that there is no irregularity of the lid margins.

After treatment consists in irrigation with warm boric acid solution four or five times daily, followed by the instillation of warmed and sterile vaselin. The sutures are removed on the fourth or fifth day. Soon after, the photophobia, lacrimation, and foreign body sensations disappear; pannus is always lessened and sometimes abolished, as a direct consequence sight is much improved, as is the asthenopia generally exhibited in the better eye of unilateral chronic trachoma, and a return of recurrent corneal ulcer is prevented.

Ptosis and entropion after this operation have not been observed by the writer, because the levator is not attached to the tarsus alone, and because the removal of a shrinking and diseased tarsal cartilage does away with a prominent factor in the production of lid edge incurvation. Entropion and trichiasis are often decidedly less marked. Ulcer of the cornea should not occur with specially prepared sutures.

LACRIMAL APPARATUS.

Infantile Epiphora. Heimann[1] justly observes that the affection is rather common and whenever we meet with conjunctivitis in infants we should always make pressure over the site of the lacrimal sac to see if there is any secretion which may be pressed out. His opinion is that it is not due to an infection but to some retardation in the development process in the naso-lacrimal duct, causing an atresia. Massage over the tear sac several times daily is a valuable method of treating these cases. Probing of course should be done when these measures fail. It is important to establish the diagnosis in these cases, for little patients, as we know, are constantly exposed to eye injuries and such injuries would be much intensified by the presence of a purulent secretion.

[In the Editor's experience the majority of these cases, which are easily overlooked and treated as if they were simple, uncomplicated conjunctival infections, may be successfully treated by frequent cleansings of the conjunctival sac with a mixture, consisting of a saturated solution of boric acid in 1 to 10,000 of bichlorid, and daily instillations of a 10 to 20 per cent argyrol solution, *provided the lacrimal sac is completely emptied by firm pressure over it,* at each treatment. The nasal duct obstruction is rarely complete or permanent and seldom requires operative interference.]

Syphilitic Dacrioadenitis. De Lapersonne[2] reports the following cases: 1. A man forty-two years old,

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(1) Deutsche med. Wochenschrift, No. 5, 1903.
(2) Archives d'Ophtalmologie, Dec., 1902.

an alcoholic. He gave a history of gonorrhea twenty years before; but none of syphilis. A few weeks before being seen he had devloped an acute double dacriocystitis, which slowly subsided leaving indurated glands. This adenitis was followed by a severe iritis and a chorioiditis with multiple adenitis of the seminal, mammary, and parotid glands. Specific treatment was not very efficient. A diagnosis by exclusion, he says, renders the syphilitic origin of the affection probable. The second case was one of primary lesion of the lid associated with a painless swelling and induration of the lacrimal gland of the same side.

Extirpation of the Lacrimal Sac. Arnold Knapp[1] advises the operation in (1) chronic purulent dacryocystitis; if of long standing and antiseptic treatment has not succeeded in curing the suppuration or if the sac is dilated. In this group of cases the great danger to the eye in possible corneal affections should not be lost sight of; (2) repeated attacks of acute dacryocystitis with abscess; (3) whenever the sac is dilated whether the contents can be expressed or not; (4) lacrimal fistula. Local or general anesthesia may be employed, the former being suitable only in the absence of acute inflammatory conditions. The incision begins just below the internal canthal ligament and passes down and out along the prominent orbital margin for from 1½ to 2½ cm. through the subcutaneous tissue and the anterior fibers of the aponeurosis until the sac itself is exposed.

Hemorrhage can generally be thoroughly controlled by a suitable introduction of the retractors and by compression. The sac is then isolated by blunt dissection from its inner wall; proceeding upward the cupola is freed and the sac can be more or less lifted out of the fossa. The outer surface, usually more inherent, has to be separated by cutting with a pair of small, blunt scissors, the attachment above and outward to the canaliculi being carefully separated.

The sac is cut off as low down in the lacrimal canal as possible and the canal is thoroughly curetted with a small spoon. A careful inspection is now made of the walls, and especially of the roof of the lacrimal fossa, with a view of detecting any remaining islet of mucous membrane, granulations, inflamed periosteum, or carious bone. These possible complications must all be properly met and radically treated. If the bone on the inner wall (lacrimal bone) should prove to be diseased and superficial curetting be deemed not sufficient, a free opening should be made right through this into the nose. This enables the removal of the diseased bone and also insures proper drainage, the opening entering the nose in the anterior part of the middle meatus just below the head of the middle turbinal.

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(1) Archives of Ophthalmology, July, 1903.

The operation is concluded by the exact approximation of the wound edges with two or three sutures, the cavity is obliterated by proper pressure, and this pressure must be kept up in the dressings for the next few days.

Salva[1] has performed *extirpation of the lacrimal sac for dacryocystitis with dilatation* since 1895. Except in cases of marked dilatation he does not cut the internal palpebral ligament. If section of the ligament proves necessary he reunites the several portions while closing the wound. He has found that hemorrhage is often abundant, but that it is always controlled by pressure. To aid in elevating the sac the author has devised a sharply curved flat hook. When drainage becomes necessary, the lower canaliculus is incised and gauze is introduced through the same, thus allowing primary union of the cutaneous wound with a minimum degree of scarring. Usually an extirpation of the palpebral lacrimal gland is done at the same time. The author has never observed lacrimation to persist for more than a few months. In irrigation of the wound after operation, slight pressure must be employed in order to avoid troublesome infiltration into the lids and orbit.

The author is favorable to the procedure. When it is refused, he fuses nitrate of silver on the point of a lacrimal probe and introduces it into the sac through the enlarged canaliculus; care being taken to avoid any burning of the conjunctiva. Five or six repetitions of this treatment at intervals of four or five days generally reduce the sac to its normal dimensions.

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(1) Annales d'oculistique, Oct., 1902.

Axenfeld[1] urges the *extirpation of the lacrimal sac* not only in long standing dacryocystitis, in ectasia, fistula, recurring erysipelas, phlegmonous and trachomatous dacryocystitis, etc., in which conditions it is generally considered necessary, but in hypopyon keratitis, and also in ordinary dacryocystitis, associated with stenosis of the duct, in patients living away from the cities. He has performed the operation 270 times in four years, and has the impression that the number of cases of septic corneal infection has diminished, and their severity has decreased, although exact proof, by means of statistics, would be difficult to obtain. He places his incision in front of the crest of the lacrimal bone, commencing just above the ligamentum canthi internum, 2.3 mm. in front of the crista, and running in a curved line down and out for a distance of 2½ cm. The cut is made directly down to the bone, cutting through the periosteum. Bleeding is stopped by means of specula, provided with curved hooks, one placed so as to stretch open the wound laterally, the other at right angles, so that all four sides are pressed upon. The sac is then removed *sub-periosteally,* the periosteum of the crista and lacrimal groove being elevated and carefully dissected out from above downward, together with the sac. In this way the sac is removed in its entirety. Before cutting the lower end, the sac is drawn upward, as much as possible, so that the lower part may be entirely removed. If the duct is then curetted, with a small curette, so that drainage is established into the nose, the wound usually heals by first intention. Care must be taken not to cut too close to the lid margin; otherwise the skin may sink into the fossa lacrimalis and produce entropion. In a few weeks the epiphora is very slight, and the removal of the lacrimal gland is rarely necessary, unless it is hypertrophied.

CORNEA.

Arcus Senilis. L. Vollaro[2] finds that the opacity which constitutes the arcus senilis owes its origin to a more or less abundant infiltration of fatty granules, both

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(1) Klin. Monatsbl. f. Augenheilk., Feb., 1903.
(2) Annali di Ottalmologia, 32, 8, 1903.

in the stroma of connective tissue and in the interstitial spaces and the lacunæ in the periphery of the cornea. At the same time, he states, the fat thus found in the cornea affected with gerontoxon has a different histo-chemical composition from the fat found in organs affected with fatty degeneration. It does not respond with the characteristic reaction of the latter to the osmic acid test, and it may be assumed that it partakes rather of the nature of stearin or palmitin or possibly oleic acid. In a certain number of cases the coincident occurrence of hyaline concretions was noted in the arcus senilis, as Fuchs has described. This may be regarded merely as an accessory fact, as even in these cases the infiltration of fatty granules is distinctly conspicuous.

Detachment of Corneal Epithelium. J. A. Menzies[1] claims that there are *two main types of the condition.* In one the attacks usually commence in the early morning or during the night, or as a result of rubbing the eye. In this form the duration of pain is brief; in the intervals the surface of the cornea may appear normal, though even then it is possible to raise the epithelium with forceps. In the other type a patch of epithelium resembling a collapsed blister is seen, and the movements of the lid over this, acting on the nerve endings, give rise to the feeling of a foreign body being present. The epithelium may be clear or opaque.

In the majority of cases there is a history of injury. In the traumatic cases there has been a superficial injury to the cornea, following which the epithelium has not become firmly reattached. Then, as in dry catarrh, the cells become interlocked with those of the lid, so that when the lid is opened the epithelium is again torn off the cornea and pain is produced. In the first type things soon settle down, but in the second a blister is formed, and this gives way or an ulcer may result.

Szili has examined the detached epithelium and finds distinct changes in the cells themselves, and he has also pointed out that when other methods of examination fail the ophthalmoscope will often reveal the lesion as an irregular shadow on the cornea.

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(1) Br. Med. Journal, Nov. 1. 1902.

Weiglandt proposes to add a third group for those cases where the detachment remains fairly permanent, and these may be called keratitis bullosa, of traumatic origin, and Menzies agrees with this.

The *diagnosis* depends largely upon the history, and the pain on opening the eye in the morning is very characteristic. In some cases fluorescine is useful, but gentle pressure on the lower lid while the patient looks down is generally sufficient to allow of the slack epithelium being seen. Suspicion should be aroused when there is apparently much pain with little or nothing to be seen to account for it.

Treatment.—After an injury the eyes should be tied up, and if possible the patient should lie in bed with both eyes bandaged until healing has taken place. When detachment has taken place, for cases of the first group, the application of some ointment or fatty substance combined with massage, is generally sufficient. In the second group the epithelium should be thoroughly removed from the affected area and its neighborhood, and then the denuded surface may be scraped with a sharp spoon. The eye is bandaged and the patient put to bed for a few days until healing has occurred.

Diagnostic Value of Tuberculin in Parenchymatous Keratitis is discussed by Enslin[1], of Breslau. At the instance of Prof. Uhthoff, he injected all (24) cases of parenchymatous keratitis, which came to the clinic during the last few months, without exception, with tuberculin, (according to the directions of Koch). In all cases (save one which was not clear), in which no reaction followed, hereditary lues could be proven and in those which reacted typically, other signs of tuberculosis could be found. The writer advocates tuberculin injections, which with proper care are harmless, in doubtful cases as a diagnostic means.

Therapy. V. Salvo[2] recommends the use of *ichthyol,* prepared with equal parts of glycerin and distilled water, especially in ulcerative keratitis of the so-called strumous variety with phlyctenulæ and diffuse infiltration of the

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(1) Deutsche med. Wochenschr., 8, 1903.
(2) Annali di Ottalmologia, 32, 1903.

cornea. It is applied with a brush, once a day, to the everted lids.

The clearing up of old and recent corneal cloudings by means of dionin is discussed by Von Arlt[1]. The author has treated at least twenty cases of corneal clouding with applications of dionin and by far the greater number were benefited but in only five cases was he able to follow the complete history through. Four of these cases were children with marked corneal cloudings and the fifth case was a man twenty-seven years old.

Von Arlt is in the habit of applying the dionin once a week, seldom as often as twice a week and never more than 0.005 at a time, which he puts into the conjunctival sac and rubs in well. When the patient or some member of the family is entrusted with the treatment he employs a ten per cent salve with lanolin which he rubs in once weekly. The treatment of course extends over a considerable length of time. The first patient was treated sixteen months, the second eighteen months, the third fifteen months, the fourth twenty-one months and the fifth patient three months. In all cases the results were startling; vision in several of the cases being brought up to the normal.

Benzoate of lithium in the treatment of corneal maculæ, is advised by Mazet[2]. Calcium carbonate and phosphate, he tells us, have been found to exist in a great number of corneal lesions. It is therefore reasonable, he says, to believe that in dissolving these salts, vision may be improved. Bunbacher alone, he tells us, has attempted to do this by means of a 5 per cent solution of sodium carbonate. This method is too violent for ordinary use. In order to obtain the same result the author has used an *aqueous solution of lithium benzoate in two and a half to ten per cent strengths.* The action of lithium benzoate as a solvent of the carbonate and phosphate of calcium is, he says, well established. For four years past he has employed this method and reports two cases. In the first, in a child of eight years, there was a diffuse corneal haze dotted with white points, which prevented a view of the pupillary area. Yellow oxid of mercury ointment had

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(1) Wochensch. f. Ther. des Auges, 11, 1902.
(2) La Clinique ophtalmologique, May 25, 1903.

been used without effect for a period of six months. Instillations of lithium benzoate solution resulted in a cure one year later. In the second case there was a densely opaque semilunar scar involving the lower part of the cornea. It had the appearance of being incrusted with calcareous material. Former treatment having been useless, instillations of the lithium benzoate solution were used for six months, resulting in a cure of the case.

Goldzieher[1] reports two cases of *gonorrheal ulcer of the cornea treated by operation.* In the first case the perforation was promptly followed by prolapse of the iris leaving a blister-like prominence. The upper portion of the conjunctiva was dissected away quite up to the fornix, threads passed in and then this flap brought over the ulcerating area (after the prolapsed part had been excised) and secured.

The other case was practically the same except that the perforation was below and the conjunctival flap was brought up from the lower fornix. The result in both cases was admirable, especially in the second case. He advises not to wait for perforation but as soon as it looks as though perforation were imminent the plastic operation should be done.

Karl Hoor[2] concludes that *jequiritol* is a remedy whose specific action is on the cornea; it has no effect upon diseases of the conjunctiva; in purulent affections of the cornea its use is absolutely prohibited; it is indicated in old cases of pannus trachomatosus, wether these are rich or poor in blood-vessels; it is also indicated in pannus eczematosus, in opacities of the cornea, after protracted inflammation, which could not be cleared up by other remedies. Both eyes, however, should never be treated at the same time.

There is no doubt, that the effects of jequiritol can be fairly well determined, but there are individual variations in the susceptibility to the drug. Its use is not entirely without danger; severe ulcerations of the cornea, and affections of the lacrimal apparatus have been observed. The severer the jequiritol ophthalmia is, the more diffi-

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(1) Pester Med.-Ch. Presse, 30, 1902.
(2) Pester Med.-Ch. Presse, Feb. 22, 1903.

cult will it be to produce another one. This immunity may last for four weeks.

The jequiritol serum prevents and moderates the subjective symptoms of jequiritol ophthalmia, but it is questionable, whether it has any beneficial effect upon the objective symptoms. The serum seems to have no effect upon the cure of the ulcer produced by the jequiritol ophthalmia. The author doubts whether it can cure or even prevent the inflammation of the lacrimal sac.

Great care must be taken as regards the severity of the artificially produced inflammation as the effect of the serum is not absolutely certain. If the above mentioned indications and cautions are well borne in mind jequiritol will prove a very valuable remedy. Its advantages over the infusum jequirity is its exact dosage.

CATARACT.

Concussion Cataract. Stirling[1], of Montreal, records a case of *cataract following an electric shock* from a live wire. A boy was struck over the left malar region by a live wire. He was senseless for an hour and artificial respiration had to be performed. Vision at the time of injury was perfect, but it gradually began to fade, so that in the course of a few months, useful vision was lost. There is a scar over the left malar prominence corresponding to the burn, but not reaching the eyelids. There is a pale bluish-white cataract. There is perception of light but the projection is uncertain.

[The lenticular opacity produced by severe shocks of electricity from any source probably belongs to the class of "concussion" cataract, of which the Editor published a number of examples some years ago.]

Senile Cataract. Manz[2] analyzes two thousand cataract extractions which he has performed during the forty years of his practice. In the early days of his work he was in the habit of performing reclination even after extraction had been introduced because the latter was regarded

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(1) Montreal Medical Journal, Jan., 1903.
(2) Münch. med. Wochenschr., 2 and 3, 1903.

as more dangerous in those days. Of the numerous conditions held as contraindications for extraction and as rather in favor of reclination in those days only four have come down to us and they are: advanced age, an extremely nervous patient, fluid vitreous and an intractable conjunctival affection. Manz reports cases in which the patients were eighty years of age. Several cases of death are reported during the after treatment, either as a result of vascular or cerebral disease, also from hypostatic congestion of the lungs. One should consider the factor of insanity in operating for cataract upon very old persons. The soft diet which was habitually given in old times is still the order of the day. Manz uses a 2 per cent solution of cocain, and he does not find that stronger solutions produce better anesthesia. He is opposed to the suggestion of Mooren that a preparatory iridectomy should be done and the cataract removed later, because many patients, after the preparatory iridectomy, finding their sight no better, become so depressed that they refuse to allow a second operation, and he thinks that it makes the section with the cataract knife more difficult. He makes the preparatory iridectomy exceptionally.

[The Editor now and then makes a preliminary iridectomy when he believes it should be done in the interests of the patient, and he does not believe that the patient's possible disappointment is a sufficient reason for declining to do it. Probably if he be told that "if one-half of the operation be done first the removal of the cataract itself will, later on, be more likely to give good vision," and that "after the first part of the operation he will see worse or no better than before," there will be no misunderstanding and rarely any disappointment, either on the part of the patient or the surgeon.]

Capsulotomy in Cataract Extraction. A. J. Erwin[1] emphasizes the importance of opening the capsule and quotes Norris, who regards this act as the "most difficult and uncertain part of every cataract operation, for while any sharp instrument carried across it will cause a rupture, or tear, it is excessively difficult, and, in fact, in most cases impossible, to make this of any desired shape....the

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(1) Ophthalmic Record, Aug., 1903.

very great diversity of practice among different operators is convincing proof that none of our present methods have arrived at any considerable certainty of result."

The writer advises the following procedure: Having dilated the pupil he enters the cataract knife in the clear corneal margin at the equator. Advancing on a plane declining ten degrees from the horizontal, he transfixes the capsule, then raises the point of the knife and counter punctures the cornea two or three mm. above the equator, and completes the corneal flap in its clear margin. Unless the capsule be unusually brittle the knife will pass up under it to the pupillary margin, cutting a smooth central flap about the size of the ordinary pupil, which will be enlarged by the passage of the lens. This large flap will naturally fall to the lower segment of the capsule, leaving a clear pupil. This operation seems to him to be so safe, so complete, and withal so easily made, that he cannot comprehend why it has not been commonly adopted. Of course, there are cases that require the forceps or cystotome, especially the contracted pupil, requiring an iridectomy, but even in this class a central vertical slit can be made in the same way, which will often be sufficient for the escape of the lens after the completion of the iridectomy. The results have been unusually good. He has not had a case of sepsis,

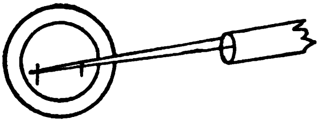

Fig. 9. Erwin's operation for capsulotomy.

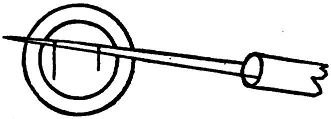

Fig. 10. Erwin's operation for capsulotomy.

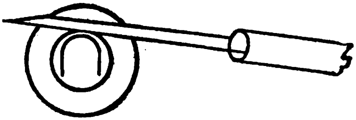

Fig. 11. Erwin's operation for capsulotomy.

iritis, or luxation, and only eight cases have returned for the secondary operation.

Intracapsular irrigation in cataract extraction is advocated by H. O. Reik[1]. He reviews the method of Lippincott and sees no reason why it should not be generally adopted in the removal of immature cataract, leaving the McKeown method a more limited class of cases. He recapitulates the advantages of the procedure as follows and says (1) that the introduction within the eye of the sterilized saline solution is harmless. (2) That the removal of cortex is a mechanical process and regulated by ordinary physical laws. (3) That, from the anatomic structure of the eye and the conditions existing during the operation irrigation is more efficient in removing cortex than any other method. (4) That just as irrigation removes cortex so it removes blood and bubbles of air. It also shows the condition of the capsule, gives tone to and replaces the iris and is effectual in making the toilet of the wound. (5) That the very free irrigation by the nozzles may be practised without fear. (6) The irrigation does not tend to cause prolapse of the vitreous. (7) That the secondary operations form a small percentage.

[The Editor, having used the Lippincott irrigator for several years, can recommend it as an instrument whose careful use has always been satisfactory. The chief care of the operator should, in his opinion, be directed towards having a 0.75 per cent saline solution, kept at 100 degrees F. and ready for immediate use, in the irrigator. This should not only be sterile but *free from dust, rubber debris or other solid particles.*]

What precautions shall we take in operating on *cataract in the presence of dacryocystitis?* Angelucci[2] believes that dacryocystitis constitutes an absolute contra-indication to the extraction of cataract. On account of the advanced age of some subjects and the lengths of time required for a cure of the dacryocystitic process, it is important to adopt some treatment which shall not only be effective, but that shall bring about a rapid cure. He employs the following method in simple lacrimal stenosis ordinarily situated at the bottom of the lacrimal sac, where he does not wish to run any risk of post-operative infection, however remote. He makes an incision with a small bistoury transversely through the entire thickness of the lid (including of course the tissues of the upper and lower canaliculi) one millimetre and a half to two millimetres distant from the lacrimal puncta. At the same time, with the galvanocautery, he touches the edges of the wound, thus insuring closure. After two weeks the cataract operation can be carried out without any danger whatever.

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(1) Annals of Ophthalmology, July, 1903.

(2) Archivio di Ottalmologia, 10, 1902.

[In cases of cataract complicated with mucocele or lacrimal stenosis, in which the canaliculi are intact and there is no pericystic infection, the Editor would strongly advise the method suggested and employed by Buller. The whole lacrimal tract is first thoroughly cleaned out and disinfected (especially with formalin solutions and Nuel's syringe) and the conjunctival surfaces made as nearly aseptic as possible. A No. 2 black silk suture is then passed through each lid margin in such a manner as to include the canaliculi, 2 mm. behind each punctum. The sutures are then tied, not too tightly, but firmly enough to prevent regurgitation from the infected sac and duct. In a case of mucocele with a constant regurgitation of pus from the lacrimal into the conjunctival sac, the Editor removed a cataract a month ago. The healing of the corneal wound was entirely normal, and the case has done well. On removing the sutures, eight days after the cataract operation, some of the 20 per cent argyrol solution (used for injection into the sac) mixed with muco-pus flowed from both puncta, showing that the constriction of the sutures had not produced organic strictures at the site of the knots but that the morbid secretions had remained within the sac, canaliculi and nasal duct. The stenosis was afterward shown to be complete, and to be situated in the lower third of the nasal canal. The thread ends had been cut off close to the palpebral skin and the knots had not irritated the globe.

Buller's procedure is certaintly preferable to that of Angelucci and better than sealing the puncta with the galvanic or other cautery, because of its simplicity, its effectiveness, and because it does not sacrifice the puncta or canaliculi. It is particularly advisable in those cases of lacrimal stenosis where the obstruction is chiefly due to swelling of the mucous lining of the duct, or to disease of the nose. In these cases we may hope by injecting (and perhaps probing) the passages through the puncta, and by treatment of the nasal complications to cure the case without destroying the canaliculi and the punctal suction apparatus.]

Spontaneous cures of cataract are classified by Walter L. Pyle[1] as follows: 1. Cases in which there was absorption after spontaneous rupture of the anterior or posterior capsule.

2. Cases in which there was spontaneous dislocation of the cataractous lens.

3. Cases in which there was intracapsular resorption of the opaque cortex and sinking of the nucleous below the axis of vision, after degenerative changes in Morgagnian cataract, without rupture of the capsule or dislocation of the lens.

4. Cases in which there was complete spontaneous resorption of both nucleus and cortex, without reported history of ruptured capsule, dislocation or degenerative changes of the Morgagnian type.

5. Cases of spontaneous disappearance of incipient cataract without degenerative changes or marked difference in the refraction.

Too much stress can not be laid on the value of personal hygiene, treatment of associate local and general disorders, careful and repeated refraction, and the proper use of the eyes in arresting the progress of incipient cataract.

In certain complicated cases, secondary to grave nutritional disturbances, lenticular opacities may entirely disappear under appropriate treatment.

Generally speaking, the so-called "non-operative" treatment of cataract as practised by advertising charlatans and irregular physicians is worthless, often distinctly dangerous, and consists in no beneficent measures not known and appropriately used by all reputable oculists.

S. Tornatola[2] employs after certain operations on the

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(1) Jour. Am. Med. Assn., Oct. 18, 1902.

(2) Annali di Ottalmologia, 32, 1903.

eye (*especially in cataract* when bandages are not well borne) the so called *"bird's foot" suture.*

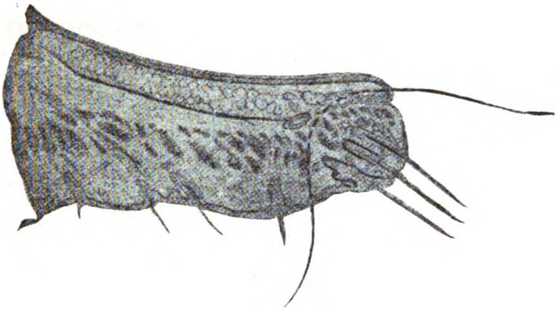

Fig. 12. Tornatola's Suture.

This method of suturing has the advantages that it can be tied and untied at will; the eye is further protected against infection when a thin layer of cotton is applied outside, moistened with some sterile solution and renewed two or three times a day.

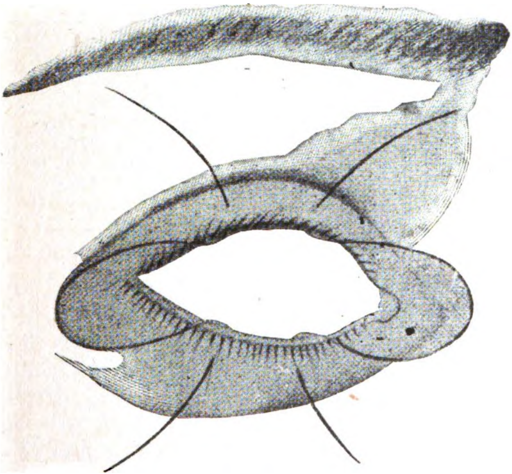

Fig. 13. Tornatola's "Bird's Foot" Suture.

It is also desirable for all cases in which the surroundings are not scrupulously aseptic, and the subjects are not intelligent and docile. In the latter case he prefers a dressing.

Suturing of the lids will also be found useful after various operations on the cornea and after sympathectomy. Two needles carrying strong silk sutures are passed through both lids (as shown in the figures), avoiding the openings of the Meibomian glands. Each thread passes for a distance of 2 mm. along the posterior surface of the tarsus and emerges about 3 mm. from the margin of the lid at the junction of the outer with the middle third. The loops made by the threads are then pulled out long so as not to interfere with the operation that follows. After this act is completed, the ends of each thread are passed through two or three beads, the margins of the lids are approximated with the fingers, and each thread is tied in a bowknot. These can be united at will every day if necessary, or several times a day. Such a method of closing the eyelids after operations has proved a great improvement in the writer's experience, over Michel's plan of dressing the eye, or Arlt's method of occlusion, or simple wire sutering. It has proved extremely useful in cases of acute or chronic exophthalmus with insufficiency of lid closure and in simple corneal ulcer complicating paralytic lagophthalmus, ectropion, etc.

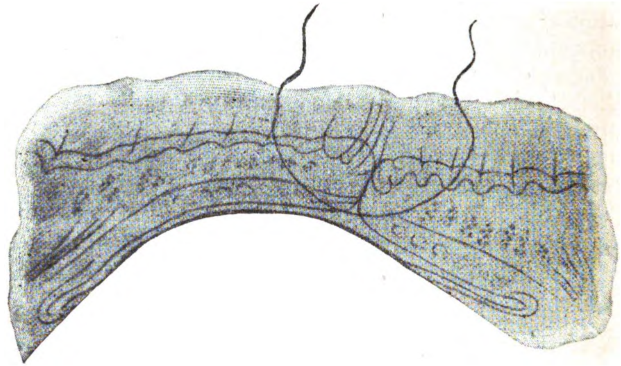

Fig. 14. Tornatola's Suture.

Post-Operative Detachment of the Choroid. Axenfeld[1] agrees with Fuchs, that *detachment of the choroid after cataract extractions and iridectomies,* is much more frequent than has generally been supposed. Since the publication of Fuch's paper, he has observed a number of cases, and is of the opinion that they are probably more frequent now than formerly, as the result of the more extended after-treatment of operative cases by the open method. His attention was first called to the fact by the observation that the reattachment was hastened very much by the constant application of a bandage, and he thinks the frequent occurrence of the condition in the Vienna clinic may be due to the regular use there of the wire protective mask. At the same time this fact should not deter one from the use of the method as the observations of Fuchs, Augstein, Bietti, Schüler and himself have shown that the non-inflammatory post-operative detachment of the choroid is without permanent injury to the eyes. On the contrary, the fact that there exists, under these circumstances, a marked lowering of the tension, would indicate that it should be considered as a fortunate occurrence in iridectomies for glaucoma. In one case in which detachment occurred after iridectomy, he was able to observe the disappearance of a decided glaucomatous excavation of the optic nerve, which reappeared as the amotio choroideæ subsided, and the tension rose—a proof, if such be necessary, that the glaucomatous excavation is a pressure excavation. The exact method by which iridectomy is effectual is even at the present day somewhat obscure, and he suggests that in many cases of iridectomy and sclerotomy there may be slight choroidal detachments, so far forward as to escape detection, associated, perhaps, with slight tears in the ciliary bodies, as Fuchs' preparations showed, by means of which a *suprachoroidal filtration* is brought about, and the tension is kept below normal, until the choroid is reattached, or the ciliary tear closed by coagulation products. Fuchs has seen two cases in which, with the disappearance of the detachment, fresh attacks of glaucoma supervened, and the condition has an analogy in the case of corneal fistula, closure of which produces increased intraocular tension, as a result of the sudden cessation of the excessive drainage. He believes, therefore, that the open treatment of glaucoma operations is especially indicated, as the greater possibility of choroidal detachment thus offered, is in the interest of the patient rather than the contrary.

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[1] Klin. Monatsbl. f. Augenheilk, Feb., 1903.

THE UVEAL TRACT.

Iritis Serosa. K. Baas[1] describes the *anatomical changes* in a case of iritis serosa. His findings agree in the main with those previously described by Grönouw, consisting of new vessel formation in the middle layers of the cornea, round cell infiltration of the posterior lamellæ, irregularity of the endothelium lining Descemet's membrane, and the presence of heaps of round cells on the posterior surface of the cornea, free in the anterior chamber, mixed with fibrin and blood, and on the surface of the iris. The iris was also infiltrated with round cells, and as it was firmly adherent to the lens capsule, so that no communication existed between the anterior and posterior chambers, Baas believes that the precipitated cells on the posterior surface of the cornea could have been furnished only by the iris. He thinks that in many cases of iritis serosa the deposits have the same origin, and do not arise from the ciliary body. The probable explanation is that it is a simple sedimentation, and as the axis of the eye is naturally directed downward, so that the concave posterior surface of the cornea is directed upward and backward, the particles precipitate on the cornea, in the form of a triangle, just as they would in a glass flask, turned on its side.

Tuberculous Iritis. Calderaro[2] asserts that *tuberculosis of the iris* is, in 85 per cent of all cases, secondary to other tubercular lesions of the organism. Only in 15 per cent of the cases is it due to a primary infection in the iris, the bacilli having penetrated through the corneo-conjunctival surface. It occurs in two different forms, one very serious which entails the loss of the eye, and the other, the so-called attenuated infection, which is capable of spontaneous cure. There are no characteristics, clinical, anatomic nor experimental, which enables us to differentiate these two varieties. The course of the affection alone

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(1) Zeitschr. f. Augenheilk, Jan., 1903.
(2) Clinica Oculistica, July, 1902.

is the only criterion for the diagnosis. Tuberculosis of the iris may appear in three different clinical manifestations, miliary, conglomerate and infiltrated. The attenuated form usually assumes the miliary aspect. The prognosis is always grave for the eye and should be guarded in respect to the individual. Death occurs in 50 per cent of the cases in which the ultimate results are known. The prognosis *quoad vitam* is improved by enucleation. Treatment should be expectant so long as there exists a possibility of preserving some degree of visual acuity or at least we should attempt to preserve the eyeball for esthetic reasons. The attenuation of the tubercular affection in the iris is not due to a diminished resistance on the part of the specific bacillus, but on the local conditions of organic resistance.

Two years ago Shieck[1] published a communication on the *treatment of tuberculous iritis with tuberculin.* He analyzed all the cases recorded up to that time. All the cases treated, even the worst forms, got well. There was no danger of the bacilli migrating to other parts by the use of this method. Handmann[1] had an opportunity of testing the question and he reports two cases in which tuberculous iritis was treated with injections of tuberculin. He commences with injections of 1/1000 mg. and goes up to as much as 3.0 mgr. and gives in all thirty-one injections. The injections were given every other day and generally in the forearm. In both cases the cure was complete and permanent.

C. H. Felix[2] again draws our attention to the treatment of tuberculosis of the iris and cornea by *insufflation of air into the anterior chamber.* He reports two cases of tuberculosis of the iris, and one of tuberculosis of the cornea, in which the process was arrested by means of insufflation of air into the anterior chamber, a treatment based upon the good results obtained in tubercular peritonitis, by operative interference. Detailed clinical histories are given, and the method is described as follows: After the usual cleansing of the field of operation and anesthetization of the surface by instillation of cocain, an

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(1) Klin. Monatsbl. f. Augenheilk, Oct., 1902.

(2) Zeitschrift f. Augenheilk., Dec., 1902.

ordinary discission needle is passed through the cornea into the anterior chamber, and then cautiously withdrawn. Through this opening the canula of a Pravaz syringe is entered, after the syringe has been half filled with sterile air (drawn in through a piece of sterilized cotton). The aqueous is then drawn slowly into the syringe, the piston being held on a lower level than the anterior chamber. As soon as the chamber is entirely empty the air is forced in, without withdrawing the canula, care being taken to avoid increasing the intra-ocular pressure beyond the normal. The eye is then bandaged. These insufflations of air were repeated about once a week for from three to twelve weeks. No untoward reaction was observed and the air was usually absorbed and replaced by aqueous in a few days. Felix believes that the results are not to be ascribed to the mere paracentesis and removal of the aqueous, but to the action of one of the constituents of the air—probably the carbonic acid—upon the tubercular tissue.

Uveitis. The *treatment* of certain non-specific *lesions of the uveal tract* with pilocarpin and sweat baths is again recommended by T. A. Woodruff[1]. The author states that while many lesions of the chorioid and ciliary body are by their nature irreparable, a large minority are capable of some improvement and that notwithstanding the claims of many of the newer remedies none of them has given as good results in selected cases as the hypodermic use of pilocarpin in conjunction with sweat baths and the internal administration of potassium iodid in increasing doses, with large quantities of water, to toleration.

As the hypodermics and baths should be given when the stomach is empty, there being less danger from the untoward effects of pilocarpin at that time, they are best administered the first thing in the morning. The patient should be in bed and wrapped up to the neck in a blanket and again covered with at least four blankets. Under the latter half a dozen quart bottles containing boiling hot water should be placed. The hypodermic injection of pilocarpin hydrochlorate beginning with one-eighth of a grain should now be given, at the same time having the patient drink at least a pint of hot water, weak lemonade or tea.

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(1) Journal Am. Med. Assn., Oct. 4, 1902.

In a few minutes the patient should begin to break out into a profuse perspiration, which should continue for at least two hours, only stopping short of that time if he shows any bad symptoms. At the end of the sweat he should be thoroughly dried and the skin rubbed with alcohol and then allowed to rest the remainder of the day. This treatment should be continued at least every other day until twelve such baths are taken. After an interval of two or three weeks a similar course of treatment should be repeated, and then continued at various intervals as long as any improvement takes place.

Iridectomy in Iridochorioiditis. G. Immermann[1] reports the lasting results of iridectomy on 180 cases of principally chronic iridochorioiditis, treated at the ophthalmologic clinic at Basel from 1870 to 1900. The clinical histories are arranged in tabular form; 60 per cent were observed in women. Iridectomy acted favorably, as in almost all cases the inflammatory symptoms disappeared and the intraocular pressure became normal. Central vision was improved in 61.90 per cent, useful vision preserved in 28.60 per cent, while in 8.96 per cent iridectomy had an unfavorable result. Peripheral vision was improved in 6.51 per cent, impaired in 2.12 per cent. Although the curative effect of iridectomy cannot be satisfactorily explained, it cannot be too highly appreciated. Poor results were obtained mostly in very far advanced cases or when complicated by opacities of the lens, detachment of retina or secondary glaucoma.

OPTIC NERVE AND RETINA.

New Formation of Connective Tissue of the Optic Disc. Meniscus of Connective Tissue (Kuhnt). Mayeda[2] describes 25 cases, collected from literature, and 19, observed at the eye-clinic at Giessen. The affection consists in a membranous formation of connective tissue of irregular form and thickness, of snow white color, which gives a glaring reflex, at the optic disc or the adjacent portions of the retina. Most frequently it occurs at the

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(1) Inaug. Dissertation, 1903.
(2) Beiträge zur Augenheilk, 54, 1902.

center of the disc and covers the central physiologic excavation and the entrance of the central blood vessels, but also at the periphery or at both places, or it may extend almost over the whole disc and a part of the adjacent retina. Its size varies from one-eighth to twice the disc, and it may be combined with other changes in the eye. Four cases showed amblyopia. Of the 44 cases 18 were emmetropic, 20 ametropic, 6 not ascertained. The author enumerates the views of various authors as to the anatomical character of this formation. His opinion is that it is a congenital affection and is perhaps a remnant of the connective tissue surrounding the hyaloid artery. It must be distinguished from retinitis proliferans, which, as a consequence of hemorrhages of the vitreous, is always accompanied by impairment of sight.

[The Editor would remind the reader that a fine picture of one of these remarkable growths is to be seen in Oeller's atlas of Rare Fundus Conditions, under the caption *discus et conus opticohyaloideus.* He saw recently, in the practice of T. A. Woodruff, an example of this condition.]

Hereditary or Family Optic Nerve Atrophy. Lauber[1] relates the histories of four brothers all of whom were subjects of atrophy of the optic nerve. The trouble commences usually at puberty, though it has been observed as early as the fifth year. It generally appears under the garb of retrobulbar neuritis and rarely do we notice any swelling of the papilla. It is seldom acute and generally in a year it has run its course. Generally one eye after the other is attacked and usually some vision remains. Central scotoma is often present. The periphery of the visual field can remain normal. Therapy is fruitless. Males of the family are more prone to the affection than the females. The etiology is very obscure. Instances are recorded where the trouble showed itself in five generations. Possibly intermarriages among relations may be a factor.

Rupture of the Optic Nerve. This injury consists in a solution of continuity of the optic nerve in the plane of the lamina cribrosa, and is of very rare occurrence, there being only eight cases in literature. Salzmann[2] gives the

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(1) Münch. med. Wochenschr., Dec. 9, 1902.

(2) Wien. med. Wochenschr., July 25, 1903.

history of a case, as follows: A young man shot himself with a revolver in the right temple; examination after 12 days showed in the left eye only suffusions of the lids, but in the right eye there was edema of the lids, and the movements of the eyeball were very limited. The ophthalmoscope showed an opening in the papilla; in the vicinity of this opening the retina was missing and there were large extravasations of blood; the border of the opening could be seen with a +3 D convex lens, the depth of it with a concave 9 D lens. This difference of 12 D corresponded with an opening of 3 mm. In the succeeding 5 weeks this opening shrunk to one-third its size, and was replaced by connective tissue. Rupture of the optic nerve may be caused by trauma induced by a blunt object on the orbit, such as an umbrella, a horn of a cow, a rod, etc., or by a shot from a revolver against the temple. The author considers this injury not a direct effect of the trauma but an indirect sudden traction on the nerve, thereby causing its rupture in the scleral aperture.

Embolism and Thrombosis. Panas[1] has reviewed briefly the history of *embolism and thrombosis of the central retinal vessels.* The sudden loss of vision, the characteristic appearance of the arteries and the diminution of the volume of the veins in a centripetal direction, the red spot in the fovea and the nebulosity of the surrounding retina, the absence of signs of stasis and the want of prominence of the papilla, he says, all speak for the complete obstruction of the central artery by an embolus, yet hemorrhage into the vaginal sheath and certain forms of acute retrobulber neuritis may produce similar changes. The anatomico-pathologic examination also may often fail to establish a diagnosis, since after a few months' time the differentiation between an embolus and a thrombus becomes impossible, especially when it is remembered that the majority of the patients so attacked are of advanced age or are afflicted with some dyscrasia or disturbing factor such as syphilis, alcoholism, diabetes, or arthritis in whom arterio-sclerotic changes are marked. From the standpoint of general pathology he has found that occlu-

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(1) Archives d'ophtalmologie, Oct., 1902.

sion of the vessels by thrombosis is much more common than that due to embolism.

The *diagnosis of venous thrombosis,* he states, depends upon the usual retention of some visual power, the distention or (alternating distention) and contraction of the veins, and the absence of the venous pulse, the contraction of the arteries, and the frequent presence of retinal hemorrhages which are usually seen around the disc. The prognosis of venous thrombosis, he believes, is less serious than that of classic embolism.

As to the *treatment* of these affections, little can be done. He believes that mydriatics should be avoided upon account of the tendency to thrombosis.

Alcoholics should not be used. Iodid of potassium in small doses may be tried. [Why not employ deep massage—the only remedy that has really cured a case of embolism of the central artery of the retina?—ED.]

Choked Disc. A case of choked disc after a successful operation for an abscess of the brain is reported by A. Sachsalber.[1] Before the operation there was a hyperemia of the optic nerve but no choked disc; six days after operation, however, there was a typical picture of choked disc. For a few days the condition of the optic nerve remained stationary, and only after six weeks did the nerve become normal again. No functional disturbances were present during the entire process.

There are two theories as regards the formation of choked disc, the mechanical, which is based on a primary intracranial increase in pressure, and the chemical, phlogistic theory. This case speaks for the production of the neuritis rather by toxic means, because the mechanical element was eliminated by the opening of the abscess and notwithstanding that the neuritis optica was considerably increased.

Detachment of the Retina. Jocqs[2] briefly reviews the discussion of de Wecker and L. Dor on the technic of *subconjunctival injections.* Dor, he says, claims to make the injections under the capsule of Tenon, while de Wecker believes the so-called subconjunctival injections are in

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(1) Wien. med. Presse, July 19, 1903.
(2) La Clinique Ophtal., Nov., 1902.

part subtendinous, but do not remain so because of the incomplete closure of this space. As yet no method, he tells us, of rendering the injections of concentrated fluid painless has been discovered. De Wecker, he says, has reported that the employment of the vitreous humor of animals as a solvent attains such an end.

The author first evacuates the subretinal fluid with a narrow von Graefe knife and then makes the subconjunctival injection. He quotes a case which has been reported by Thilliez and in which rapid cure followed a triple subconjunctival injection of a 33 per cent strength solution of chlorid of sodium combined with three drops of a 1 per cent strength solution of acoin, in association with the observance of absolute decubitus for two weeks.

TOXIC AMBLYOPIA.

Toxic Amblyopia from Coffee. P. B. Wing[1] relates the following case: On June 22d, 1902, the patient, an apparently healthy, well-nourished boy, of eight years, was brought by his mother, who stated that since January, 1902, she had noticed failing vision and that he had been sent home from school on account of his eyes; that she had consulted a home physician, who had fitted him with glasses, but the vision had steadily become worse. Upon examination the conjunctiva was normal; cornea, lens and vitreous clear; pupil a little larger than normal and sluggish; the optic disc was much congested; could hardly distinguish the outlines. Retinal veins large—arteries small—vision hardly 20/200 in each eye for distance, near vision correspondingly reduced; field contracted as shown in Diag. No. 1. Wing tried to find some cause for the condition—thinking the boy might be smoking cigarettes; but there was no history of using tobacco in any form. It was found that he drank six to eight cups of strong black coffee daily, and the patient but eight years old! The coffee was stopped at once, and strychnin, 1/50 gr., ordered three times daily. He returned in eight days; the vision had improved from 20/200 to 20/20, though still

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(1) Annals of Ophthalmology, April, 1903.

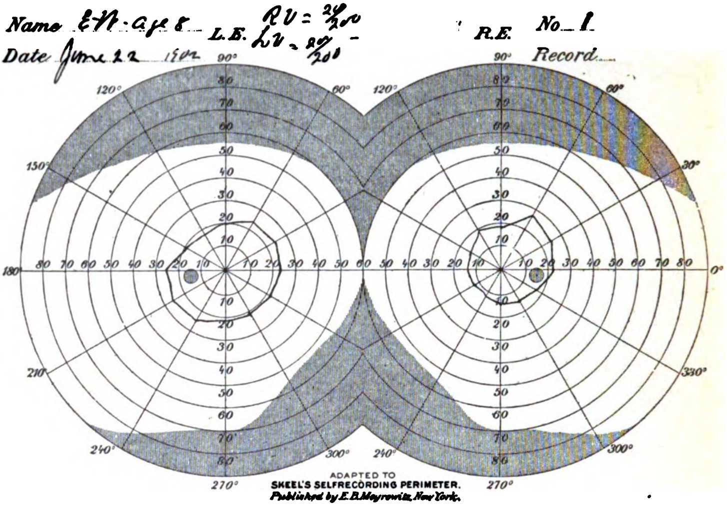

Fig. 15. Wing's case of Toxic amblyopia from coffee. Field for white when first seen.

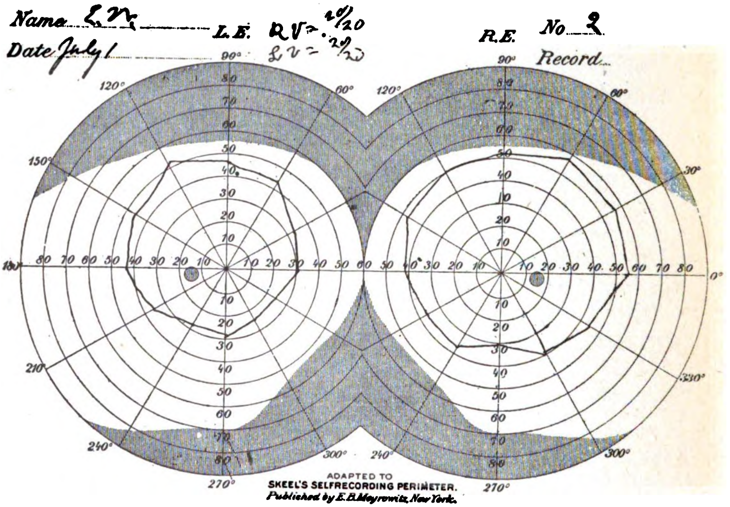

Fig. 16. Wing's case of coffee amblyopia. Field for white after ten days' treatment.

slow and hazy—field had increased as shown in chart No. II. The treatment was continued for a month. Upon his return, July 22d, vision was 20/15 and near vision perfect—field had further increased as shown by chart No. III. Vision has remained perfect and health good. He returned to school in September, and has had no trouble.

Acute Iodism and Anterior Polar Cataract. G. Corda[1] reports the following case of bilateral cataract induced by potassic iodid given internally: a healthy and robust man to relieve a tendency to obesity, took 30 drops daily of a solution of potassium iodid in distilled water, 30 gm. of each. He commenced with 5 drops and increased by 5. The third day he noticed muscular pains in the sole of the foot, extending to the leg on the fourth day, and by the seventh he came to the Clinic with lacrimation, photophobia and blepharospasm. He had taken in all 1.5 gm. of the iodid. Medication was suspended the next day; examination disclosed myosis and a slight opacity in both eyes, resembling a semi-transparent disc in the center of

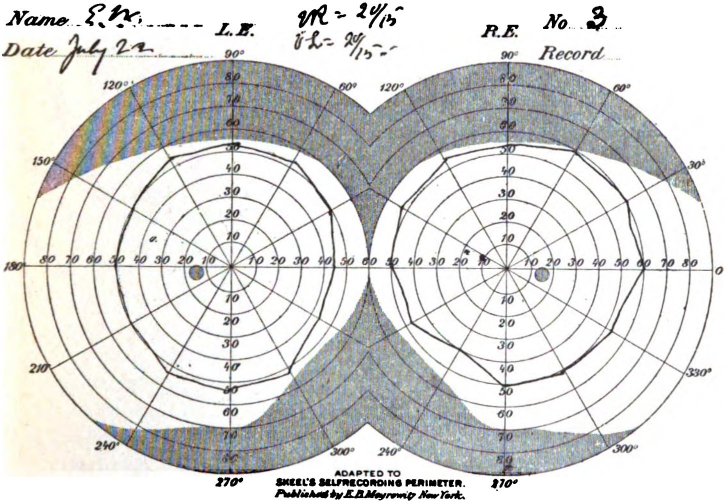

Fig. 17. Coffee Amblyopia (Wing). Field for white after a month's treatment.

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(1) Annali di Ottalmologia, 32, 1903.

the capsule of the lens, with an irregular space between its edge and the margin of the iris. A regular and narrow black zone was also noticeable on the free margin of the iris. It was impossible to determine whether the opacity was or was not extra-capsular, but Corda accepts it as behind the capsule. No treatment was attempted except suspension of the iodid and irrigating the eyes with a solution of boric acid. The patient was able to count fingers at two yards only, but when he returned four days later, vision had improved 5/7.5 on Wecker's chart, and the fundus of the eye appeared perfectly normal. Vision improved 5/5 at the end of the month.

Methyl Alcohol in Extracts and Medicines. R. H. Main[1] reports another *case of blindness followed by death from methyl alcohol.* The deceased, a watch tinker, an inebriate, 44 years of age, being unable to obtain whiskey, drank lemon extract for several days. On February 17, in the morning, his sight began to fail and he stopped drinking. On the morning of February 18, central vision was gone, but he retained some peripheral vision; by noon he was blind, and died at midnight. The cases reported of blindness and death from drinking methyl alcohol, or extracts containing it are tabulated, and the paper summed up. The writer affirms (1) that methyl alcohol is an active and dangerous poison. (2) That it is capable of producing and has produced, in numerous instances, permanent blindness and death even when taken in small quantities (Burnett 5.6 c.c., dram 11/2—Raub 7.5—18.5 c.c., dram 2 to 5). (3) That it is used extensively in substitution for grain alcohol and in the manufacture of extracts, spirits, and medicines, intended for internal use and that its use is not suspected by the consumer. If, in the face of the evidence presented to us daily, anyone should deny its toxicity we may certainly be justified in considering him beyond the reach of argument. The use of methyl alcohol has proved lucrative and so long as that is so it will be used extensively. A series of what are called facts are produced to prove its harmlessness but the cases of blindness and death give them the lie. If it is not poisonous, there is no reason why it should escape a federal tax.

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(1) American Medicine, Sept. 5, 1903.

Main suggests to our Pure Food Commissions and Boards of Health: (1) To require every manufacturer to publish on every package the formula of the preparation, as is done in England. (2) To prosecute every one failing to do so. (3) To recommend a federal tax on methyl alcohol so that its substitution for ethyl alcohol will not be profitable.

THE OCULAR MUSCLES.

Idiopathic Myositis of the Extraocular Muscles is discussed, with the record and microscopical report of J. E. Gleason.[1] He says, with reference to the rarity of the disease, that, although by their position the extraocular muscles are not liable to secondary inflammation in articular rheumatism, it seems probable, as Wright has recently mentioned, that they are liable to be the seat of a muscular rheumatism, and there seems to be no reason why they should be immune to other diseases of muscles.

Strabismus. Improvement of vision in *amblyopia from non-use* is noted by Harry Friedenwald.[2] The nature of amblyopia in strabismus has long been an object of inquiry, and whether strabismus itself will lead to amblyopia or the condition is congenital can only be proven, first, by definite cases in which eyes with good vision become amblyopic from strabismus and, secondly, cases of marked improvement in vision in previously amblyopic eyes after their continued use.

Under the first heading four cases are cited, being reported by reliable authorities, while the list of cases which tend to prove that an amblyopic eye may recover its sight is now becoming quite extended, fifteen being referred to. Besides these cases are those in which sight is lost early in childhood in consequence of double cataract. The author reports a case of divergent strabismus and traumatic cataract of about 70 years duration being removed with V = hand-movements, two weeks after the operation and not improved with lenses; which within a year became = 10/40 with + 6.00; with + 15.0 he reads S, 1.5 D; when seen about four years after the operation, with the same glasses V = 6/XV and reads 0.5 German print fluently. The author feels no hesitation in placing this case with those referred to under the first heading as

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(1) Ophthalmic Record, Oct., 1903.
(2) Ophthalmic Record, Jan., 1903.

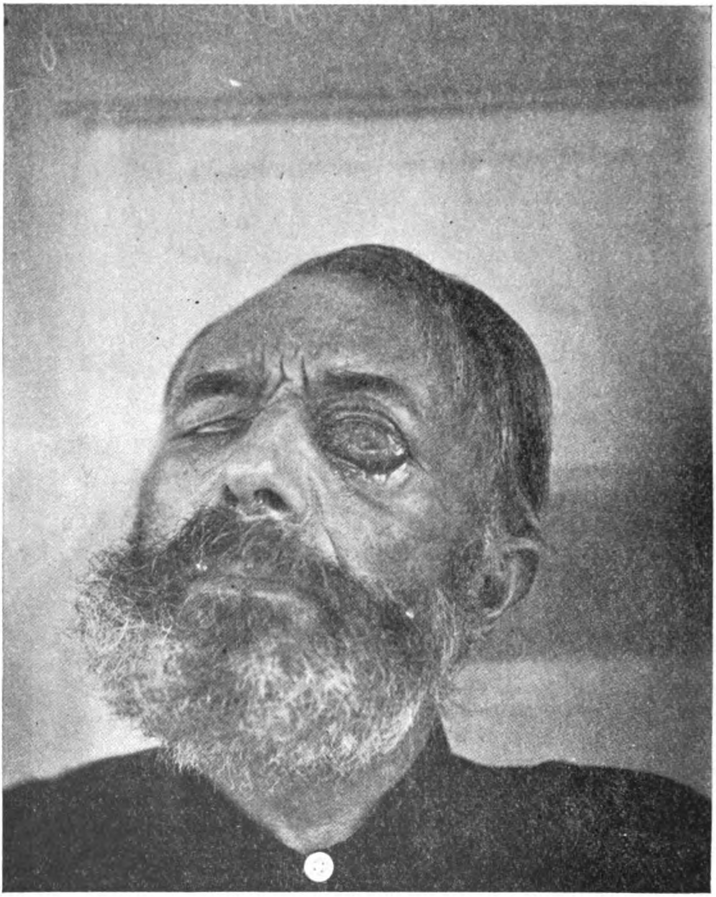

Fig. 18. **Gleason's case of extra-ocular myositis.**

offering another instance of the genuineness of amblyopia from non-use.

A *prism-sequence for measuring heterophoria* has been devised by Walter Pyle[1]. It may be used in conjunction with the Maddox rod, the red glass, or the prism diplopia-test.

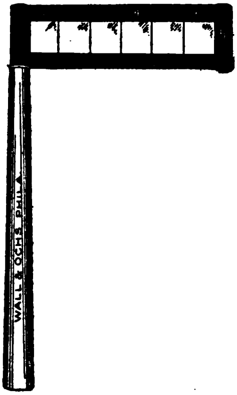

Fig. 19. Pyle's prism-sequence holder.

The instrument consists of a frame two and one-half inches long, and five-eighths inch wide, containing six small prisms, each three-eighths inch square, arranged bases out, beginning at the left as follows: 1°, 2°, 3°, 4°, 5°, 6°. The figures denoting the strength of each prismatic square are inscribed in white on both sides of the black frame. The handle may be screwed into either end of the frame, but is usually placed on the right end, near the 6° prism. The name of instrument or the maker's name is placed on the front of the instrument, and the letter B is stamped in white on the frame to denote the base of the prisms.

In making tests for heterophoria, it is common to place the Maddox rod before the left eye. In such case, if the light-streak is seen to the left, as is commonly the case, the instrument is moved to the patient's right, carrying the handle toward the patient's nose until the streak exactly

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(1) Ophthalmic Record, July, 1903.

bisects the light. In cases of hyperphoria, the prism-scale is moved up or down, as the defect requires. In measuring exophoria with the rod before the left eye, the instrument is reversed by a complete turn of the handle and brought before the left eye from the patient's right; or the handle may be screwed into the left end of the frame, adjoining the 1° prism, making a sequence with bases in, and then carried towards the patient's left, away from the nose.

An Operation on the Tendon of the Superior Rectus Muscle for Paresis of the Superior Oblique, is described by Edward Jackson.[1] The author reports several cases successfully treated and cured of diplopia, headache and vertigo, by what is virtually a transplantation of the tendon of the superior rectus muscle to a point situated back and outward (temporally) from the original insertion. He says that when the superior oblique is weakened or completely paralysed a strong effort is made to have its functions performed by the other ocular muscles, the intorsion by increased action of the superior rectus. On the other hand, the superior rectus is inhibited, to prevent the eye from being turned up or in, the superior oblique no longer turning it down and out. If, then, one seeks, by operation on the superior rectus, to aid this process of compensation, he must: First, increase the power of the superior rectus to cause intorsion; second, diminish the power of this same muscle to cause upward rotation of the eyeball; third, lessen the tendency of the superior rectus to turn the eye in, and increase its power of acting with the inferior oblique to help turn the eye out. Those indications are all met by displacing the insertion of the tendon backward and outward.

The backward displacement corresponds to that which would be produced by an ordinary tenotomy, in so far as the power of the muscle to rotate the eye upward is concerned. But the ordinary tenotomy would diminish the power of the muscle in equal proportion for all purposes, and thus would defeat the effort to bring about compensation. When the insertion of the muscle is displaced outward as well as backward the relations between the differ-

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(1) Ophthalmic Review, March, 1903.

ent effects produced by a given contraction of the muscles are altered, and a totally different result is secured. The outward displacement of the insertion is like an advancement of tendon, in that it increases the power of the muscle to produce intorsion. It also increases the power of cooperation with the inferior oblique to help turn the eye outward; at least it opposes the tendency of the inferior oblique to cause extorsion, and thus enables it to come somewhat to the assistance of the externus.

The incision begins about 8 mm. back from the cornea, over the nasal third of the tendon, and extends 3 or 4 mm. beyond the temporal margin of the tendon, its temporal end being farther back from the cornea. Through this incision the tendon is raised and isolated on the strabismus hook. A small half-curved needle threaded with fine silk is then entered through the tendon near the nasal border. The needle and sutures are carried beneath the tendon, emerging at its temporal margin. At the point previously fixed upon, the needle is made to enter the sclera. It is carried about 3 mm. in the firm sclera tissue, and made to emerge. After this the needle is passed beneath the temporal margin of the tendon and caused to pierce it and emerge. Now the free ends of the sutures and the loops which are left loose, are drawn out of the way. The tendon is divided close to its insertion and the suture is tightened and tied, bringing the central portion of the tendon in close contact with the sclera. In the loop, about the middle third of the tendon (3 or 4 mm.) should be included; the scleral loop should be slightly less.

The displacement of the insertion should be made to represent double the number of degrees of the deviation to be corrected. Thus to correct an extorsion of 5 degrees (10 centrads) the insertion of the muscle should be carried outward 2 mm. To correct an upward deviation of 10 degrees (20 centrads, a 20-degree sprism) the insertion of the muscle should be carried back about 4 mm."

Capsular Ligature in the Operation for Strabismus. Trousseau[1] inserts a capsular ligature in the external rectus muscle, after tenotomy of the internal rectus. He describes the operation as follows: The patient is made to

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(1) Annal. d'Oculistique, Jan., 1903.

look inward, or the eye is held in that position. The tendon of the rectus externus is grasped through the conjunctiva, by means of fixation forceps, and drawn upward; with the other hand a long curved needle is passed into the episcleral tissue near the corneo-scleral limbus, then through the tendon, keeping close to the sclera, then under the inner face of the muscle and finally through it and all the tissues adherent to it, to merge through the conjunctiva near the outer canthus. Moderate tenotomy of the internal rectus is then performed, with a conjunctival suture, and the two ends of the capsular ligature are tied while the eye is drawn to the outer angle. The bunching of the tissue is not very great, and disappears ultimately without leaving a trace. The thread is allowed to remain from 6 to 12 days, according to the result obtained. Trousseau aims to secure an over-correction of about 5°. In twenty-seven cases he secured satisfactory results in twenty-one; two were over-corrected and four under-corrected.

THE ORBIT.

Enucleation and Its Substitutes.

Injections of Fat for Prothesis. Barraquer[1] explains his method of treating an eye after enucleation. He considers the conjunctiva as bounding a cavity (like a sponge) in the meshes of which fatty (or other) tissue will grow. Paraffin or vaselin is not true fatty tissue. Fatty tissue is well adapted to develop when nourished by the abundant blood supply of the orbit.

His technic is as follows: Before section of the recti muscles each is caught up by a thread so that they can be united afterward. Then an ordinary enucleation is performed and in the place of the globe he inserts a lump of fat taken from the gluteal region, supporting it there while the muscles and mucous membrane are stitched about it. The strictest asepsis is necessary. The results are excellent.

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(1) Archivas de Optalmologia, July, 1903.

Paraffin Injections. The cosmetic value of paraffin injections after enucleation of the eyeball is discussed in a most valuable paper by Maitland Ramsay[1] of Glasgow. The writer describes *his method of procedure in using paraffin for forming a stump* on which to fit an artificial eye, and gives his experience in 22 cases of this sort, having been well satisfied with the cosmetic result and with the free movement of the prothesis. He describes the operation which we give in full.

The patient having been placed fully under the influence of chloroform, the eyelids are separated and kept apart by a spring speculum. The conjunctiva is divided as close as possible to the corneal margin, each rectus muscle is caught up on a strabismus hook and sutured to the overlying conjunctiva with a strand of catgut, the tendons of the recti muscles are cut at their insertion into the sclerotic, and thereafter the operation for the removal of the eyeball is completed in the ordinary manner. If adrenalin chlorid solution be freely used the amount of bleeding is very slight and the hemorrhage is easily stopped by douching the socket with hot sterilized water. The capsule of Tenon is packed with gauze till a strong black silk purse suture has been passed round the conjunctival margin, and then, the packing being removed, the melted paraffin is injected with a carefully sterilized glass syringe, the capsule being opened to its utmost capacity by holding the recti muscles on the stretch by means of the four catgut sutures, and filled to overflowing. The purse suture is then tightened (care being taken to hold the patient's head steady and to relax the tension on the recti muscles) and is securely fixed by a double knot, and the catgut sutures are tied, the superior rectus muscles being approximated to the inferior and the internal to the external. The paraffin is thus induced to mould itself in the socket and to form a stump to which the divided muscles readily attach themselves. The excess is wiped away and, after the conjunctival surface has been carefully bathed with boric solution, a compress and bandage are applied.

This operation is followed by very little inflammatory reaction, and as a rule causes the patient hardly any more

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(1) The Lancet, Jan. 31, 1903.

discomfort than simple enucleation does. The purse suture is kept in place for a fortnight and when it is removed at the end of that time there will be found over the freely movable paraffin stump a clean non-discharging surface of conjunctiva. A week later an artificial eye can be adjusted, the ordinary shell proving as a rule quite satisfactory, though sometime better results can be obtained from the use of the form recommended by Snellen. Care needs to be taken that this is not too large, otherwise the paraffin stump will move behind the prothesis. To insure success two points require special attention: First, the operation must be carried out with every precaution against sepsis and so it must not be attempted in cases where the eyeball is in a state of active suppuration, and, secondly, the sutures must hold the conjunctiva in accurate position over the paraffin. It is on the purse sutures that most reliance requires to be placed, and it is therefore very important to see when this is introduced that an equal grip is taken of the conjunctiva all around the free edge and also that too wide an interval is not left between the stitches; but the catgut strands to which the muscles are attached afford great additional security. In one of his recent cases, in which the suture holding the internal rectus muscles broke, a little opening made its appearance on the seventh day after the operation opposite the attachment of that muscle and the aperture grew gradually larger and larger until the paraffin escaped.

In his series of 22 cases there have been four failures. Thrice the paraffin has come out through insufficiency of the stitching, but in two of these the conjunctiva was simply drawn together by the catgut holding the muscles without any continuous suture. The purse suture was introduced in his fourth case and since then the only occasion on which the stitches have given way was that referred to above where the suture securing the internal rectus muscle broke. On one occasion after enucleation of a suppurating eyeball, pus appeared in the socket and set up so much inflammatory reaction that the stitches were removed and the moulded paraffin was allowed to escape. The paraffin employed is a sterilized preparation melting at 40° C., specially prepared by Rogers of Oxford street, London. It seems simply to lie in the tissues and gives rise to no irritation, but whether it will at length become absorbed or not time alone can show. Up to the present time none of the cases have given any sign of either shrinkage of the stump or impairment of its mobility.

Oatman[1] of Brooklyn, discussing *Mules' operation,* prefers a *paraffin ball,* having a melting point of 120° F., to the glass ball vitreous. He contends that when, from any cause, a fistulous opening has once formed over an artificial vitreous, it resists all attempts at repair until the foreign body has been expelled. Under these circumstances it has always appeared that if a portion of the ball could be removed and the tension of the scleral walls relieved, we might hope for closure of the wound over the remainder. The following plan for using some material for the artificial vitreous that can, if necessary, be removed piecemeal, has not been previously employed.

He describes the procedure in a case in which he performed Mules' operation in the usual manner except that instead of glass, a ball of paraffin was employed to fill the vitreous cavity. The paraffin employed had a melting point of 120° F. The wound apparently closed satisfactorily; but it was soon discovered that a small fistula existed through which the plastic paraffin was slowly oozing. With a Daviel spoon, warmed in hot water, a considerable quantity of the paraffin was easily extracted through the opening, the edges of which were then freshened and sutured. No success attended this procedure, the fistula remained patent and the paraffin continued to escape. Two subsequent attempts to close the hole were followed by failure, and it was decided that paraffin was unsuitable material for this purpose. No change for the better occurred until the paraffin had been discharged down to the level of the fistula, which, as the sclera had been stitched transversely, was about the center of the ball. When this point had been reached and about one-half of the paraffin had leaked away, the opening closed spontaneously and has remained closed since, a period of ten months. The remaining paraffin forms an excellent cushion for a shell, and the stump has good motility. He

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(1) **Medical Record, March 7, 1903.**

further directs that in preparing the ball the paraffin be first brought to the boiling point and then cooled very quickly, as in histologic work, to prevent crystallization and the formation of bubbles. A ball is then roughly shaped with a knife. This is brought to the required size by placing it on a long needle and rotating it in the flame of an alcohol lamp, the action of the flame being controlled by occasionally dipping the ball into a cold bichlorid solution. A plastic material like paraffin will adapt itself to any inequalities on the surface of the glass shell, and ulceration from pressure is not apt to occur. Paraffin beads are easily prepared, and may be used in special cases in which glass beads of the required shape or size are not obtainable.

Section of the Globe as a Substitute for Enucleation, is advocated by Ernest Hall.[1] The object is to remove the ciliary region in front because here is the principal place for traumatism and sepsis, which lead to loss of function, and the sclero-optic junction because through this is conveyed sympathetic and septic trouble to the other eye. With these parts, the retina and the vitreous removed, the remaining tissues are nonirritating and harmless. The sclerotic zone thus left, with muscles attached and motor nerves undisturbed, is a movable pad for the artificial eye.

The technic of the operation is as follows: The scissors having been inserted about 25 mm. behind the sclerocorneal junction, sufficiently to include the ciliary body, a complete section is made, so removing the whole front of the eyeball. The vitreous is then evacuated and the retina and chorioid removed by curette. The hemorrhage is profuse, but controlled by hot water and pressure. Then the speculum is inserted within the ball and so made to hold the eyelids and edges of the sclerotic opening. The optic nerve is grasped with toothed forceps and scissors or a long slender knife inserted as close as possible to the nerve to avoid wounding the ciliary arteries, and a circular incision made in the sclerotic, freeing the optic nerve. The nerve is then drawn forward and severed about 25 mm. from the sclerotic junction. A piece of gauze is inserted

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(1) Montreal Medical Journal, Jan., 1903.

and the sclerotic and conjunctiva closed vertically, so as to give normal tension to the internal and external recti.

The gauze may be removed in twenty-four hours. The cavity fills with blood, which becomes partly organized and so prevents collapse of the sclerotic. An artificial eye can be worn in two weeks. No sloughing of the sclerotic and no sympathetic irritation follow. The pad gives prominence to the artificial eye, and there is a wide range of movement.

[The objection, in the Editor's opinion, to evisceration, in common with all other partial removals of the eyeball that have for their main object the formation of a stump out of the remaining globar tissues is that, as Gifford and others have shown, in from six months to two years the bulbar pad is reduced to a small, pea-like nodule that affords little or no support to the artificial eye and adds nothing to the extent of the ocular excursions.]

MISCELLANEOUS.

Pulsating Exophthalmos and its *cure by ligation of the common carotid* artery is the subject of an article by Würdemann.[1] Two years previous to consulting the author, the patient—a woman, aged 40—"felt something snap" in her head, was dizzy, vomited and went to bed. She shortly after discovered that the right eye protruded and that she saw double. Rushing sounds and headache followed; after several weeks the eye protruded more, and the ocular conjunctiva became more congested. Patient was a medium sized woman, in general good health; heart, lungs, kidneys (urine examined) and other organs apparently normal with exception of eyes.

Eyes: V. R. = 6/XXIV with + 1.50 90° = — 6/VIII; L. same but with same correction V = 6/VI. Presbyopia 1.00. Visual fields large, small paracentral scotoma in right. Dist. 10° exophoria, 10° R. hyperphoria. Left eye otherwise normal; the right is protruded; conjunctival and ciliary veins tortuous and ball congested, protrusion and congestion more marked on lowering head so that eyeball can be easily dislocated between lids and is difficult of

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(1) Annals of Ophthalmology, April, 1903.

reposition. After bending down the symptoms of dizziness, headache and noises in head are greater and the vision on the affected side much lessened. A bruit can be readily distinguished by touch and the roaring sound by the stethoscope is heard, perceptibly later than the ventricular movement of the heart. The bruit is greatly increased by bending over and somewhat so by the reclining position. Finger pressure upon the closed lids reduces the exophthalmos, but protrusion immediately recurs.

Pressure over the external carotid and the common carotid in the neck, stopped the bruit and partially reduced the exophthalmos but recurrence took place on removal of the pressure. Under digital pressure over the carotid the conjunctival veins and right side of face became more congested, due of course to interference with the venous current in the jugular veins. Ophthalmoscopic examination showed right retinal veins dilated and tortuous, the arteries being relatively larger than on left side. Tying of the external carotid was tried, but the bruit and exophthalmos persisted so that the operation was extended and the common carotid occluded by two ligatures, which immediately had the effect of reducing the protrusion of the eyeball and reducing the ocular congestion, both of which, from the influence of the narcosis, had become very great. At this time two of the branches of the internal jugular, swollen as they were by the venous stasis and from the necessary handling, had started to bleed and in the endeavor to stop the hemorrhage by hemostatic forceps one ruptured, the venous blood welling forth in a dark flood. Digital compression stopped the hemorrhage sufficiently to allow of ligature being tied. From the time of operation the eye retracted, the bruit was stilled and the ocular congestion greatly diminished. The head noises were at once relieved and the patient rested well; no pain nor hyperexia, and uninterrupted recovery. The operation had the immediate effect of cutting off most of the blood supply to the eye and to the varix behind the eye in the orbit and cerebral cavity, thus reducing the exophthalmos. After the carotid was occluded, examination of the fundus by the ophthalmoscope showed that the retinal arteries carried less blood and the veins were less full and tortuous.

Eventually the vision of the right eye was 6/VIII with lenses, while the left secured vision 6/V. With correction, diplopia disappeared. The visual field was normal. The retinal veins on the affected side were more tortuous and full than on the other. The conjunctival and ciliary vessels carried more blood than the other and were permanently in a varicose condition. The exophthalmos, the noises in the head, the headaches and the general nervous disturbances had disappeared and at this date (Jan. 15, 1903) are believed to have been permanently relieved.

[In a recent article by Schou *(Ugeskrift for Laeger*—see translation by Todd in the *Ophthalmic Record* for August, 1903) the writer contends that *ligation of the internal carotid* should be resorted to in these cases; that it is not necessary to tie the larger vessels. He bases his views on the experiences of a single case.—Ed.]

Sphenoidal Necrosis. A case of *complete blindness caused by necrosis of the sphenoid bone* is reported by E. Pollatsek.[1] From the anatomic situation of the parts involved it is quite obvious that an affection of the sphenoid sinus may have a considerable influence on the power of vision. The optic nerve which lies in the foramen opticum is in such close contact with the thin wall of the sinus, that a suppurative process of the cavity extends very easily to the optic nerve, causing its atrophy. The atrophy, as a rule, is only unilateral. Atrophy of both nerves is very rare, and is observed only in cases where the destruction of bone is very extensive. The cause of the destructive process is syphilis, as a rule.

The author describes the following case: A patient 30 years of age was suffering for 15 years with severe headaches which were localized in the occiput. Four years ago his nose became affected, and small spicules of bone were exfoliated; three years ago his vision became impaired and in a short time he became totally blind. Examination of the eyes showed: Synechiæ posteriores oculi dextri, maculæ corneæ, atrophia nervi optici cum neuritide oculi utruisque. Examination of the nose showed the mucous membrane covered with dry odorless crusts; the septum, with the exception of a small part of the cartilaginous portion, was entirely absent; of the turbinated bodies only nar-

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(1) Pester Med.-Ch. Presse, July 12, 1903.

row borders remained. After cleansing the nasal cavity, a small amount of fresh pus was seen to exude on the right side, near the opening of the sphenoid sinus; the probe entered a small cavity passing through the softened middle wall; and by directing the probe toward the left side soft bone was encountered there also. The patient was subjected to a rigorous antiluetic treatment.

GLAUCOMA.

Glaucoma After Cataract Extraction. Elschnig[1] reports a very instructive case of glaucoma secondary to cataract extraction, in which the corneal wound had opened and the healing had been delayed. Histologic examination of the eyeball, which was enucleated because of the severe pain, showed a very irregular corneal wound, with attachment of the stump of the iris to the posterior surface of the cornea; the posterior surface of the cornea, both surfaces of the iris, the ciliary processes, and the remains of the lens capsule, constituting the after cataract were covered with several layers of epithelial cells, which had evidently arisen by the extension inward of the conjunctival and corneal cells, at the time of the opening of the wound; they were the probable cause of the blocking of the angle of the chamber, and of the appearance of the glaucoma. He ascribes the condition to faulty technic in making the section.

Glaucoma following cataract extraction is reported by James Bordley.[2] Under cocain anesthesia a combined extraction was undertaken. As soon as the section was made the patient, a colored woman, aged 79, forced her lids together very violently, tossed her head and made a great fuss. Before the speculum could be withdrawn she had dislocated and forced out the lens through the corneal incision, the lens was followed almost immediately by about one-third of the vitreous humor. The cornea collapsed, and the upper portion was completely everted. Every attempt to replace the cornea was followed by blepharospasm, and

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(1) Klin. Monatsbl. f. Augenheilk., March, 1903.
(2) Annals of Ophthalmology, April, 1903.

by the presentation of more vitreous. Bordley closed the eye, using a sterile pad and a Murdock eye shield.

The eye was not opened for five days as it gave the patient no pain and there was apparently no undue amount of secretion. The eye was in fairly good shape, the cornea was in good position and the incision had healed perfectly, except above where there was decided dimpling. The iris was tucked up and partly incarcerated in the corneal wound, the upward displacement of the pupil giving very much the appearance of an iridectomy. Some iritis of a low grade, tension normal; light perception only. It was not possible to see the fundus.

Atropia was instilled, at first once daily and later twice daily and sodium salicylate in 15 grain doses three times a day was also ordered. The recovery from the operation was uneventful, taking about four weeks.

The L. E. was operated on nine weeks after the R. E. was declared well, 13 weeks after the first operation. Chloroform was used and a combined extraction was successfully made. The operation was smooth, the recovery rapid and uneventful, the subsequent sight good. One month after the operation, the fundus was carefully examined and found normal, the vision tested and the following glasses ordered for constant use: R. E. Plane; L. E. + 10 S. + 2 C. ax. 180°. Vision in L. E. was practically 20/40.

In three weeks the L. E. was markedly injected, the cornea very densely steamy; tension + 2, doubtful light perception. Distressing neuralgic pains radiated over the temporal and forehead regions.

Through a misunderstanding on her part, the patient had continued to use the atropia. The R. E. was perfectly quiet.

Eserin was used and salicylate soda, gr. xx, to be given every three hours until decided effects were felt. Patient returned in three days with no improvement in her condition. The same measures were continued and in six days the cornea had cleared up enough to see the iris. At the end of five days the patient was in practically the same condition as before starting the treatment. Bordley iridectomized the R. E., making the incision in the cornea below and the excision of the iris practically straight down. The

L. E. improved from the day of the operation. As the cornea cleared, the pupil was shown bound down by posterior synechia. Two weeks after the operation on the R. E., the L. E. showed the T. normal, cornea clear, tags practically all broken down, vitreous clear, optic disc markedly cupped—which was not the case prior to the attack—vision with + 8 S. 2 Cyl. ax 180° = 20/70, a change of 2D within two months. The iridectomy on the R. E. was satisfactory and the patient's recovery uneventful.

[The foregoing fully bears out the well-known contention of Knapp that it is particularly in post-operative attacks of glaucoma that iridectomy is indicated, and in which it exhibits its most brilliant results. Excision of the iris sector almost invariably exercises a beneficial result upon the ocular structures, and in this instance probably acted by relieving the sympathetic irritation in the better eye.—Ed.]

Sympathectomy in Glaucoma. I. Komoto[1] has made resection of the cervical sympathetic in 10 cases, of which 8 were for chronic and hemorrhagic glaucoma and one each in Basedow's disease and optic nerve atrophy. In the last named the author hoped to produce a therapeutic effect from the resulting one-sided congestion. The operation can be easily done if the skin incision is made behind the sterno-cleido-mastoid. The result in all cases was negative, but he will try it again in chronic glaucoma. The "material" used in all the operations was otherwise hopeless. The author does not consider the operation as promising as has been claimed by European authors. The symptoms following the operation were slight ptosis, myosis, increase of temperature on the operated side of the face. Enophthalmos and dilatation of the blood-vessels were not specially pronounced. The intraocular tension was likewise not reduced to any noteworthy degree.

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(1) Abstract in Annals of Ophthalmology, Oct., 1903.

INJURIES.

Changes in the Eye Caused by Lightning are discussed by Stilvark.[1] A woman was struck by lightning and upon regaining consciousness complained of pain in the eyes and photophobia. The examination of the eye showed scorched eyelashes, a left hazy cornea and chemosis; the pupils were uneven, there was spasm of accommodation, pressure on the corpus ciliare was very painful and the papillæ were hyperemic. *Three days later, a stellate opacity in the posterior pole of the lens was formed,* after three weeks the opacity began to clear up, and six weeks later had entirely disappeared. The author considers all these changes to have been caused by the ultra-violet rays of the lightning.

Foreign Bodies. *One Hundred and Fifty Magnet Operations,* is the title of an important paper by W. A. Fisher.[2] If the object should be iron or steel the giant magnet should be applied as soon as the patient can be prepared for the operation. The sideroscope may be employed, as its use causes no delay. An x-ray picture only causes delay and this favors infection. We can remove the metal long before it is possible to have the x-ray done. X-ray pictures are of use only in old cases, for recent ones the loss of time is too great. Use the magnet in a proper manner with a negative result in a recent injury, and even if later the foreign body is located with an x-ray picture, what more can be done? A negative x-ray picture, after an unsuccessful magnet operation, gives us double assurance that a foreign body is not present. Sightless, quiet eyes that appear perfectly normal are preferable to glass eyes. After enucleation the use of an artificial eye often militates against the chances of obtaining employment and lessens the earning capacity. Magnus and Würdemann estimate the loss of an eye in mechanics at 27 to 30 per cent during the first year after the accident and 18 and 20 per cent during the subsequent period. Sightless eyes are often not recognized as such.

Some operators object to the giant magnet when the metal is a long piece lying crosswise in the vitreous for

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(1) Wien. med. Wochenschr., July 25, 1903.
(2) Ophthalmic Record, Jan., 1903.

fear of injuring the eye to a greater extent; this fear is groundless, as the foreign body will turn and approach the magnet lengthwise. Fischer says that magnet operations may be divided into two great classes: first, for eyes that positively contain a foreign body and second, those in which we have every assurance of the presence of a foreign body, but the magnet gives us a negative result. The negative result of the magnet is not positive proof that there is an absence of metal in the eye, but when it cannot be found with the giant magnet and a negative x-ray picture is obtained it may be pretty positively affirmed that there is no metal in the eye.

The objection of some operators to the strength of the giant magnet is easily overcome by the use of a properly constructed rheostat.

The author uses in most instances a 4 per cent solution of cocain, and by this local anesthetic obtains the assistance and co-operation of the patient. He gives these statistics:

Symptoms of metal in the eye, but negative result with magnet	49	Cases
Metal removed	97	"
Metal found in eyeball after enucleation—"magnet negative"	4	"

RESULTS.

Good vision	96	Cases
Sightless eyes—"External appearance good"	34	"
Enucleations	20	"

The magnet failed to extract the metal in only four cases in which the metal was found after enucleating, but Fisher believes that it was not so much the fault of the magnet in not extracting the metal from these cases as it was inexperience in handling the instrument. To do the magnet justice, very large pieces of metal are usually fatal to the eye, no matter how they are extracted.

Sympathetic Ophthalmia. Römer[1] reviews in a critical manner all the theories and important works on sympathetic ophthalmia and makes the statement that *no satisfactory explanation of the pathogenesis* has yet been given.

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[1] (1) Archiv für Ophthalmologie, Band 2, 1903.

He holds that the disease is due to an infection which for the eye is pathogenic but which is indifferent so far as the rest of the body is concerned, and which reaches the other eye by metastasis. It may be that the organisms concerned belong to the well-known group of saphrophytes. His opinion is that the infection reaches the other eye by way of the circulation. This theory Römer thinks explains satisfactorily the clinical aspects of the disease. The organism of course has not yet been discovered. He calls attention to the fact that luetic retinitis and papillitis are true samples of infections which have reached the eyes through the general circulation, and he places in this category of non-traumatic inflammations sympathetic iritis, papillitis and iridocyclitis.

TUMORS.

Molluscum Contagiosum of the Ocular Conjunctiva. Ballaban[1] describes a growth situated on the ocular conjunctiva, the size of a hazel nut, which extended from the outer commissure nearly to the cornea. The conjunctiva was firmly attached, but the growth itself was movable in the underlying tissue. It was yellowish red in color, had a lobulated appearance, and was quite elastic. It was readily removed and healing was prompt. The microscopic examination showed that it was a molluscum contagiosum of the conjunctiva, a condition which has not previously been described. Catarrh of the conjunctiva, caused by the presence of molluscum contagiosum on the skin of the eyelids has been described by Steffan, Mütze, Elschnig and Schäfer. Two of Schäfer's cases had corneal involvement. All of these cases proved intractable until the growths were removed. Ballaban's case is the first in which the conjunctiva was the site of the tumor, the usual position being the face, the neck, hands, forearms, genitalia and eyelids.

Nævus Pigmentosus of the Conjunctiva and Cornea is reported by Oppenheimer[2]. A very large melanoma of the conjunctiva, occupying two-thirds of the cornea, smooth, lobulated, soft, 1 mm. thick, not movable, intense-

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(1) Archiv f. Augenheilk., April, 1903.
(2) Deutsche med. Wochenschr., 7. 1903.

ly black, made, at a first glance, the impression of a melanosarcoma. It occurred in a man 75 years old, who had it since birth. It never grew and remained benign.

Glioma. In reporting five cases of glioma Christian Holmes[1] recalls Wintersteiner's tables respecting the *origin of the neoplasm.* They originate, according to this observer, three times oftener from the inner than the outer layers of the retina. One must remember that the growth is not limited to one layer of the retina, but may spring from several layers in the same case. It has been observed that gliomata have their origin four times more frequently from the posterior than from the anterior half of the globe. The same author accepts Cohnheim's theory that tumors have their origin in the masses of embryonic cells which are at times left over in the building of the normal structure, these cells remaining dormant in their embryonic state until at some later period they take on an active and perverted growth. Schöbl, who has observed a very large number of this class of tumors, concludes that glioma may start from the supporting fibers of any of the layers of the retina, but mostly from the inner nuclear layer. In this layer Da Gama Pinto found that the nuclei were mostly in process of division with karyokinetic figures.

Death may result from: 1. Involvement of the brain. 2. Cachexia. 3. Pressure of the growth on the medulla oblongata. 4. Suffocation from extension of growth into the pharynx and larynx. 5. Pyemia or septicemia, with metastatic abscess. The *duration of life* when there is no surgical interference varies greatly, but from a few months to three years is the average. A few cases have been reported where the first period lasted five years from the time the disease was first discovered. The average duration of the second stage is from 2 to 21 months, while the third stage from the rupture of the cornea to the fatal termination is the shortest, varying from two weeks to one year, with an average of three months.

If there is no return in two years after enucleation the case may be regarded as cured so far as that side is concerned, but we must remember that the disease may occur in the other eye a considerable period after the first eye

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(1) Jour. Am. Med. Assn., March 28, 1903.

becomes affected, and we must then regard it as an independent attack in the same patient and not a recurrence of the primary growth.

The only *treatment* that can be considered as offering any chance of saving life is removal of the affected eye, with as much as possible of the optic nerve, at the earliest possible moment during the first stage. In operations undertaken during the second stage, before the rupture of the cornea, the chances of success are very slight, since the affection has often extended outside of the globe through the veins and lymph channels. But even then it is our duty to operate, and exenteration of the orbit should be added to the enucleation of the eye, if we hope to arrest the disease. In this stage Holmes regards the use of pastes far superior to the use of cutting instruments, because the liability of opening up new avenues of infection is much greater in the latter method.

When the case has once entered the third stage the rule is that, no matter how thoroughly exenteration is performed, there is always recurrence within a few weeks, and operation in this stage is only justifiable in order to afford temporary relief.

[Since his recent experiences with two cases of glioma retinæ the Editor has, after enucleation of the globe or evisceration of the orbit *in the case of all malignant tumors,* applied the *Röntgen rays to the orbital region.* He believes that when this is thoroughly and systematically done, the probability of a cure is much greater than when mere removal of the eyeball is depended upon. The germs of recurrence are almost invariably present after even the most careful excision or exenteration. A return of the tumor is, consequently, less likely if the x-rays are brought to bear on the orbital cavity immediately after the operation. They should be applied for two or three months. In any event, if recurrence does result it is more likely to end in a death less painful to the patient and less horrible to the parents and friends, with the x-ray treatment. In that event the neoplasm advances towards the cerebral end of the orbit, and a fatal termination need not be feared from that most dreadful of all ends—death from exhaustion due to the slow destruction of the bones and soft tissues of the face and the gradual extension of the growth to distant organs.]

Julius Fejér[1] reports an important case illustrating the *difficulty in certain cases of making the diagnosis between glioma and pseudo-glioma.* In a backward, rachitic child, of 4 years, examination of the apparently blind, left eye showed a yellowish reflex through the pupil, detachment of the retina, with atrophic patches, in places surrounded with pigment scattered over its surface. The eye was free from inflammation, and the tension normal. In the right eye the entire fundus was covered with various sized atrophic areas, involving the chorioid and retina. The media on both sides were clear. Three weeks later photophobia and lacrimation began, the pupil was dilated and the tension was found to be increased to + 1. Enucleation was advised, as an intraocular growth was suspected. This was refused and the patient taken to Fuchs in Vienna, who considered "the yellowish-white spots in both eyes to be the beginning of a glioma, especially as increased tension has appeared on the left side." The diagnostician not being absolutely sure, he advised waiting, and roborant treatment. After several weeks the eye became softer, and the ciliary injection disappeared, the child grew stronger, and six months later Fuchs thought that there was no longer any danger from tumor. After an observation period of 1½ years the tension was normal, the tumor was atrophic and smaller, and the other patches in the fundus had become paler. The condition of the fellow eye remained the same, except that the yellowish-white spots had paled perceptibly. The fact that glioma may begin in the form of white plaques, scattered through the retina, makes the interpretation of such cases difficult. Here, however, the facts that the spots were not elevated, that they were surrounded with a pigment border, which is absent in beginning glioma, that they were diffusely scattered over the fundus, instead of being in groups, and that the retinal vessels passed in an uncurved line over their surface, made the differentiating points. The fact that in the course of one and one-half years they had not grown, but had become paler and whiter, made a diagnosis a certain one. Schick reported a similar case in 1900, in which masses of exudate, which he considered fibrinous in character, formed between the chorioid

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(1) Archiv f. Augenheilk., November, 1902.

and retina, and did not change in the course of one and three-fourths years.

OCULAR SYMPTOMS IN GENERAL DISEASES.

Histologic Changes of Retina-Chorioid in Leukemia. Nakaizumi[1] reports this case. A woman, aged 46, suffered from leukemia for four years. Proportion of white to red blood corpuscles 1:5.5, 21 days before death 1:2.7. The ophthalmoscope showed a diffuse opacity above the disc, and a white patch with red margin above, and another below the disc of the right eye. The diffuse opacity was caused by infiltration with leucocytes, the white patches by an accumulation of white blood corpuscles surrounded by a ring of red blood-corpuscles. The layer of the nerve fibers and the fibers of Müller were loosened by cellular infiltration.

Pathologic Anatomy of Albuminuric Retinitis. Koppen[2] describes the anatomic changes which he found in two cases of albuminuric retinitis. He is particularly concerned in the explanation of the star-shaped figure in the macular region. He is of the opinion that changes in the blood vessels and disturbances in the circulation underlie the anatomic changes in this form of retinitis. He does not think that the star figure is due to degenerative changes going on in the radiating fibers, but we have rather pathologic anatomic foci between the radiating fibers which are to be regarded as the terminal events in the history of a chronic inflammatory change in the retinal circulation, and the little patches represent exudates and old hemorrhages and their peculiar position between the radiating fibers and the typical course of the blood vessels in the macular region cause the characteristic figure. The hemorrhages can take place in any retinal layer in which blood vessels are present. That part of the retina between the granular layers is, according to Koppen, peculiarly predisposed to hemorrhages because in this location very fine capillaries are to be found and it is in these capillaries that the first changes are to be seen.

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(1) Deutsche med. Wochenschr., 186. 1903.
(2) Zeitschrift f. Augenheilk., Dec., 1902.

Fundus Changes in Miliary Actinomycosis. L. Müller[1] examined the eye grounds of a patient who was supposed to have miliary tuberculosis. Near the optic nerve there were a number of small, yellowish-white spots, about $\frac{1}{4}$ the size of the papilla, over which the retinal vessels made a distinct bend; the nodules were surrounded by pigment. The eyegrounds were otherwise normal. At the autopsy the condition proved to be a miliary actinomycosis, instead of tuberculosis. Anatomic examination of the eyes showed that the nodules were situated in the retina, instead of the chorioid, and were composed of collections of very large mononuclear epithelioid cells, the nuclei of which stained poorly. No micro-organisms could be found. These nodules of large, poorly staining cells are characteristic of actinomycosis, and represent the reaction of the tissues to the irritation of the fungus with destruction of the invading organism.

Affections of the Eye Caused by Scurvy. G. Weil[2] reminds us that affections of the eye in scurvy are some of the rarest complications of this disease. The writer examined, during an epidemic of scurvy in a prison, the eyes of 61 patients afflicted with the disease. In five cases he found complications. Ordinarily bleeding of the conjunctiva or the lids or other affections of the exterior of the eye are observed, but the author found in his cases affections only of the interior of the eye. In three cases there was found neuritis optica and in two cases, retinitis ad maculam. With the exception of one case of neuritis optica all recovered completely without any local applications or treatment of the eyes.

Myopia Caused by Diabetes Mellitus. Neuburger[3] reports the following two cases: 1. A woman, 50 years old, until 4 months ago had normal power of vision and with + 2 D was able to read the smallest type. She complained that lately her vision "in distance" became considerably diminished, but that she was able to read nearly without glasses. Examination showed a right myopia of 1 D, and a left myopia of 2 D; with the ophthalmoscope nothing abnormal could be seen. The urine contained 3.5 per cent

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(1) Klin. Monatsbl. f. Augenheilk., March, 1903.
(2) Wien. med Presse, July 19, 1903.
(3) Wien. med. Wochenschr., July 25, 1903.

sugar. Antidiabetic diet had no effect on the percentage of sugar but the myopia disappeared in three weeks. 2. In the second patient the myopia gradually increased to right 3 D, left 8 D. Diabetic myopia is usually considered to be caused by *changes in the lens* (swelling), and inasmuch as it is well known that myopia appearing in old age is often caused by the beginning of cataract, it is highly probable that many cases of diabetic myopia are produced in the same way. Another cause might be an increased index of refraction in the lens, and Heine was enabled to prove an increase of the index by direct measurements of a clear lens. These changes are obviously caused by disturbances of nutrition. We should, therefore, always bear in mind the possibility of diabetes in a case of myopia which sets in suddenly in old people in whom the media of the eye are clear.

Tabes Dorsalis. The *eye symptoms of tabes dorsalis,* in 140 cases, are discussed by Joseph Collins,[1] with particureference to the pupillary phenomena, ocular palsies, and optic nerve atrophy occurring with this disease.

The pupils were unequal in 25 per cent and irregular in 6 per cent of the cases. In 94 instances in which the size of the pupils was noted, it was pin-point in 36, small in 27, medium in 25, and dilated in 6; in 45 per cent the pupils were small.

In 101 of the 140 patients, the pupils did not contract on exposure to light, in 15 the pupils were slugggish, making 80 per cent in which there was loss of light reflex. It is very uncommon for the pupils to lose their capacity to contract in accommodation in tabes, but this peculiarity was present in 9 instances.

Diplopia was noted as having occurred 32 times, 22 per cent. In the majority of these instances it was comparatively an early symptom, and intermittent. There was a history or evidences of paralysis of one or more of the eye muscles in 14 cases, 10 per cent; the third nerve was affected most frequently. Some degree of ptosis was noted in 7 cases, 5 per cent. Nystagmus-like movements of the eye in forced positions, such as looking to the right and to the left, were noticed in 21 cases, 15 per cent. It is com-

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(1) **Medical News, March 14, 1903.**

monly supposed that ocular palsies are of frequent occurrence in tabes; but the writer found only 15 per cent, including the ptosis cases, and these figures agree with those of Bramwell and v. Sarbo.

Optic nerve atrophy was present in 19 cases, 14 per cent; other statistics vary from 7 to 30 per cent. The condition was not an early symptom, this experience being sharply in contrast with that of Starr. *In no case did the superimposition of blindness seem to have any effect upon the course of the disease,* this being at variance with the experience of Dejerine and others who report cases of tabes in which the development of optic atrophy was contemporaneous with amelioration of tabes, and who speak of "tabes arrested by optic atrophy."

Intraocular Cysticercus. Süsskind[1] reports one of those rare cases in which the parasite (a subretinal example) was removed through a scleral incision, with preservation of the globe and the retention of some vision. The eye, when first examined, showed diffuse opacities of the vitreous, with numerous floating membranes, which were successfully cleared up by means of subconjunctival salt injections, and the administration of potassium iodid, so that the head of the parasite could be seen moving beneath the retina. The incision was made through a conjunctival flap below, and on opening the sclera, the bladder appeared in the wound, and was withdrawn by means of iris forceps. The wound healed promptly, but the vision remained poor because of a central, flat detachment of the retina. This method is to be preferred to enucleation, which otherwise would be necessary.

[The Editor would draw attention to the article (Annals of Ophthalmology, Oct. 1903) on *bilateral,* intra-ocular cysticercus, by H. V. Würdemann. This unique condition is well described and illustrated and the paper fully discusses a disease so extremely rare in America.]

Double Optic Neuritis Complicating Whooping Cough. William E. Gamble[2] finds in literature reports of three cases. He gives a full report of his own case, and concludes: 1. Optic neuritis complicating whooping-cough

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(1) Klin. Monatsbl. f. Augenheilk., February, 1903.

(2) Archiv. of Ophthal., July, 1903.

seems to occur most frequently in girls (four cases, all girls). 2. It occurs with or without evidence of cerebral complications. 3. Vision may or may not be disturbed. 4. Prognosis as to sight good when no cerebral complications exist. 5. That optic neuritis may result from direct action of toxins of pertussis upon the head.

Migraine. A simple *treatment of scintillating scotomata* is published by Capauner.[1] According to that writer the etiology and the seat of the affection is uncertain. Charcot explained it as due to a vascular spasm situated in the cerebral cortex. Dufour was the first to call attention to a difference between negative and positive scotoma. The physician Plateau, though blind for forty years, had attacks of scintillating scotomata until his death and in his case the origin must have been situated in the cerebral cortex. In cases observed by Schneider, Galezowski, and others, the cause must have been retinal. The cephalalgia in these cases is usually located just above the eyebrows.

Having cured a case of simple cephalalgia located in this region by *ocular massage,* the author adopted the same method in scintillating scotomata. He has treated twelve cases with very satisfactory results by this method. He gives the history of three of them in which the attacks had continued for years, and in which relief from his plan of mechanotherapy has been permanent and complete. He says that the success of ocular massage renders the retinal origin of the affection very probable. The beneficial effects are attributed by him to the vascular changes which are induced not only locally but in a considerable part of the central circulation by a mechanical alteration of blood tension.

[This method of treatment is surely simple enough and is worth a trial. The ophthalmic surgeon has ample opportunity to apply remedies in migraine, owing to the large number of patients who consult him under the erroneous impression that the disease is a form of headache resulting from eye-strain.—Ed.]

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(1) Annales d'Oculistique, October, 1902.

OCULAR THERAPEUTICS.

Suprarenal Capsule and Its Derivatives. Testimony in favor of the value of this organic remedy accumulates, and a number of extracts and other preparations have been placed on the market. *Adrenalin chlorid,* applied locally in solutions of 1 to 1000—5000, seems still the favorite, and its action is substantially that of other adrenal remedies.

Hemostatin, 1 to 1000 solution, is slightly more irritant than either adrenalin or ordinary solution of the powdered capsule in camphor water, but its hemostatic effect is quite as pronounced.

Suprarenin, said to be a "sterilized solution of suprarenium hydrochloricum, 1 to 1000, the diluent being 0.90 per cent salt solution," is the most recent candidate for favor. It is said to be miscible with cocain, eserin, atropin or zinc sulphate, without producing decomposition.

Suprarenalin has been found, in the Editor's hands, to furnish the most satisfactory results. It relieves the ordinary congestion of the vessels supplied to the anterior globar section and to the palpebral conjunctiva, "whitens" the sclera and is the most effective agent we have so far employed for giving a clear operative field in strabismus and other bloody operations on the eyeball. Moreover, it seems more stable than the other capsule preparations.

Sodium Salycilate. Large doses of sodic salicylate are recommended by Harold Gifford[1] in *rheumatic and some other inflammations* of the eye. There are certain classes of cases where its advantages are not sufficiently appreciated and usually *the dose given is too small* to accomplish the best results.

He has found the average patient will stand during the waking hours, *i. e.,* 7 A. M. to 10 P. M., one grain to each pound of weight, and gives it as follows: one ounce of the salicylate is dissolved in four ounces of brandy, which gives approximately 15 grains to the teaspoonful, which is given each 1½ hours in about 1/8 glass of water followed by the same amount of water or a cracker to get rid of the taste; it is best to begin with a little less amount at first

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(1) Ophthalmic Record, Dec., 1902.

and the patient should go to bed after the third or fourth dose, being allowed to go without the drug for a day or two each third or fourth day; the patient is warned to keep the head wiped dry if there is much perspiration as a severe cold may be taken. If the stomach rebels a change to giving the drug in capsules followed by the brandy and water may be resorted to. The temporary blindness and deafness are extremely exceptional and need have no more weight than the blindness which results from moderate doses of quinin; some cases of delirium have been reported following its use.

The writer has tried aspirin with about the same unpleasant symptoms when enough to produce good results was exhibited.

In all non-specific inflammations of the iris, ciliary body, sclera and episcleral tissue, whether of rheumatic origin or not, the writer believes salicylate of sodium is the most important drug; it is of great value in acute retrobulbar affections of the optic nerve; also in acute glaucoma as recommended by Sutphen. In those cases classed as optic neuritis, there are many conditions not really inflammatory, but due to stasis or thrombosis, in which more faith is placed in large doses of the iodids than the salicylate, as also in posterior chorioretinitis. Special stress is laid upon the use of salicylate in sympathetic ophthalmia, post operative or traumatic inflammations of the iris and ciliary body, interstitial keratitis and herpes corneæ.

In sympathetic ophthalmia Gifford places it ahead of mercurial inunctions but frequently uses the two alternately. Emphasis is laid upon the necessity of keeping up the use of the salicylate one or two days a week for a long time after the last sign of acute inflammation has disappeared.

In interstitial keratitis which is plainly the result of hereditary syphilis, the action of the salicylate is much less active and certain than in those that show no marked signs, but many times does more good than both iodids and mercury. Those cases of iritis which not unfrequently occur after cataract extraction respond most promptly to generous use of the drug.

In herpes corneæ the use of the salicylate in connection with local applications of iodin gives relief where hot applications and atropin fail.

In explaining the drug's action, the rapid elimination from the body by the kidneys is against it being a germicide or germ hindering substance as from a 1:1000 to 1:500 solution is necessary to check the growth of ordinary white and yellow pus cocci very decidedly. The theory of Oltramare is more plausible, according to which "a local depletion is produced by general capillary dilatation which the salicylate causes." Reference is made to the remarkably favorable influence which an optico-ciliary neurectomy (in which a large part of the blood supply to the eye is cut off) exerts upon the traumatic inflammations, and the action of cardiac depressants in checking colds. The diaphoresis produced is considered as a secondary factor in the good influence produced by the drug.

H. Gradle[1] agrees substantially with Gifford and believes that the value of the agent is not as much appreciated as it deserves; particular stress is laid upon giving the drug in large doses; an adult requiring 20 grains at least 4 to 5 times a day, while if 25 grains can be tolerated 5 or 6 times a more decisive influence is quickly obtained. Good results have been obtained by the author in episcleritis, deep scleritis, minute superficial corneal infiltrates, phlyctenular keratitis, some cases of non-syphilitic keratitis and nodular sclero-keratitis; in iritis the drug has been a disappointment although it benefits many patients, reducing the severity of the symptoms and probably hastening the course, no matter what the etiology. Traumatic irido-cyclitis with sympathetic irido-cyclitis of the other eye is benefited. In syphilitic keratitis and spontaneous cyclitis the author's results have not been good.

Gradle has never seen any good results from this treatment of acute retinitis, retrobulbar neuritis or optic disease of unknown origin. On the other hand he has observed prompt recovery in non-traumatic and non-suppurative tenonitis.

Brucine. Skorjuchow[2] has been using a preparation which contains less than 0.1 strychnin. It is injected under

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(1) Ophthalmic Record, Feb., 1903.
(2) Die ophthal. Klinik, May 20, 1903.

the skin of either the temporal region or of the arm in quantity varying from 0.005-0.02. When the injections are made daily he generally uses 0.01 and if the intervals are greater he uses 0.02. The number of injections in cases of optic nerve atrophy were twenty-six and from forty to fifty in cases of retrobulbar neuritis. In employing this treatment one must be careful to keep a close record of the visual field and to stop the treatment if there appears the slightest evidence of retinal irritation. He has employed this treatment in forty-six cases (eighty-nine eyes) and in sixty-seven eyes improvement was noted. In eighteen no result was obtained, while in four eyes the process grew progressively worse. All in all, he thinks that *this drug increases the intensity of the central and peripheral vision of both healthy and diseased eyes* and stimulates the action of the muscles, diminishes the grade of the paresis, and frequently produces dilatation of the vessels of the fundus. He advises its use then in various forms of amblyopia, in acute and chronic retrobulbar neuritis of either alcoholic or other origin, in ordinary optic nerve atrophy and in retinitis pigmentosa and in the various forms of ocular paralysis. It is to be perferred to strychnia in the treatment of optic nerve atrophy inasmuch as it produces a dilatation of the vessels of the retina and in this way promotes the carrying off of the pathologic products, at the same time helping the nutrition of the part. The treatment is contraindicated in all acute inflammations, as for instance in retinitis.

Sublamine as a Disinfectant. Blumberg[1] describes in detail the experiments reported at last year's Surgical Congress in Berlin, and announces the results obtained from practical applications of sublamine (ethylenediamine-sulphate of mercury).

He calls attention to the importance of selecting the mercurial salt having the greatest power of tissue penatration, which, as his experiments have demonstrated, is sublamine. Furthermore, corrosive sublimate frequently causes eczemas of the skin; and exact experimentation has shown that the very slightest roughness, the most insignificant scaling of the skin, make an efficient redisinfec-

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(1) Münch. med. Wochenschr., Sept. 16, 1902.

tion more and more difficult. As Schleich, Gottstein, Haegler and others have insisted, *a good condition of the hands is the first desideratum for efficient sterilization;* and sublamine, even in very concentrated solutions, in which sublimate cannot be employed at all, does not attack the skin.

After reviewing the extensive literature on sublamine in hand sterilization, Schuftan[1] expresses the belief that its use will also be extended to other fields, such as to the treatment of syphilis. As its employment here will also be internal, subcutaneous, intramuscular and intravenous, it is of great importance to obtain an exact idea of the toxic action of the drug; and for this purpose he has made a series of experiments to determine the *relative toxicity of sublamine and sublimate.*

Twenty-one experiments with rabbits weighing from two to three pounds, gave the following lethal doses:

	Sublimate.		Sublamine.	
By mouth	0.01 gram	(1/6 grain)	0.4 gram	(7.5 grains)
Subcutaneous	0.01 "	(1/6 ")	0.1 "	(1 2/3 ")
Intravenous	0.005 "	(1/12 ")	0.0075 "	(1/8 ")

By weight, therefore, sublamine administered by mouth or intravenously is less poisonous than corrosive sublimate, while subcutaneously it is equally so. Taking into consideration, however, the fact that 1.7 grams (25 1/2 grains) of sublamine are equal in mercurial content to 1 gram of the bichlorid, its poisonous effect subcutaneously is considered greater, and intravenously is somewhat greater than that of sublimate.

The more vigorous action of sublamine, when administered by the skin or the veins, is most easily explained by its property of not coagulating albumin. Taken by mouth, this does not enter much into consideration; but by the other ways it causes a more rapid and ready absorption of the drug.

The author concludes by stating that the non-irritancy of sublamine may render it especially appropriate for syphilis, and that the painful infiltrations that occur may in this way be avoided.

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(1) Inaug. Dis., Aug., 1902.

Mydriatic Drugs are classified, in an excellent paper by Chas. A. Oliver,[1] as analgesics, mydriatics, iridoplegics and cycloplegics. They always act locally and local applications never affect the fellow organ in a similar way.

1. Most prominent among the mydriatic agents are: holocain, cocain, eucain, euphthalmin, homatropin, mydrin, atropin, scopolamin, daturin, hyoscyamin, hyoscin and duboisin. As is well known, many of these alkaloids, although differing by but one or two elemental atoms each, or even when absolutely isomeric, have variable physiologic actions on one and the same series of ocular structures.

3. The chief effects of this class of therapeutic agents on the eye consist in external and internal analgesias combined with local paralyses of the sphincter muscles of the iris and ciliary body. By some observers most of the drugs (particularly atropin, daturin, scopolamin, hyoscyamin and duboisin) are supposed to exert simultaneous excitatory actions on the radial fibers of the iris and the ciliary body. Some of the drugs are said to contract the blood vessels and to act on the peripheral ends of the nerves. A number of authorities believe that cocain, holocain and eucain mydriases are due to local irritation of the sympathetic nerve endings in the iris (both vaso-constrictor and pupil-inhibitory fibers).

The local effects of the drugs are increased by bodily rest, with non-usage and non-exposure of the ocular organs. Cold applications diminish both the primary and secondary actions of the drugs. Heat tends to promote both these results.

All solutions should be freshly prepared or made up in small quantities and kept for brief periods of time; care must be used to prevent their passage into the lacrimal and nasal passages during their instillation.

The drugs which are employed for the definite and determinate purpose of *pure mydriasis* in ophthalmology are comparatively few. In the writer's hands they are limited in the order of their relative values to the following: euphthalmin, homatropin, mydrin and ephedrin.

Of *euphthalmin*, usually in the form of hydrochlorate, 2 drops of a 5 per cent solution, produce an almost maximal

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(1) Jour. Am. Med. Assn., Feb. 21, 1903.

mydriasis lasting two or three hours under strong light stimuli, pupil returning to its normal size in twenty-four hours. The ciliary muscle is slightly affected.

Homatropin usually used in the form of hydrobromate is used in 2 per cent strength as a mydriatic and in greater strength for a cycloplegic; a drop of 1:500 strength instilled into the conjunctival sac every five minutes for five times will produce a maximal dilatation of the pupil in three-quarters of an hour, returning to normal in 14 to 18 hours. *Cocain increases the effect* and is used in combination with homatropin in gelatin discs containing one-fiftieth of a grain each.

Mydrin is an artificial preparation of one part homatropin to 100 parts ephedrin in a 10 per cent aqueous solution; the pupil reaches its maximal dilatation of 4 to 7 mm. in 30 to 35 minutes, and returns to normal in four to six hours' time. This mixture is more effective as a mydriatic than either of its constituents alone. They produce a loss of accommodation of one or even two diopters at maximum dilatation.

Ephedrin is used in a 2 per cent solution, one or two drops producing almost complete mydriasis in an unirritated eye in 50 minutes, and lasts for about 12 hours. The action on the ciliary muscle is very slight.

Eumydrin. Goldberg[1] has made experiments on the action of the new mydriatic eumydrin on the pupil and accommodation. He found that a one per cent solution acts from five to eight minutes quicker than a 1-1000 solution of atropin, producing a dilatation of from 2.5 to 3 mm., and that its effect disappears toward the end of the second day, while that of the latter is present still on the fourth day. It acts more rapidly and thoroughly than homatropin solution of the same strength and its effect lasts about twelve hours longer. In pathologic conditions the mydriatic effect seemed to be about the same as that of one per cent atropin, but it is not so lasting. Moreover, the drug produced no increase of pressure or other untoward phenomenon either in the normal or diseased eye.

Bromid of Methyl-Atropin, a new mydriatic, is, accord-

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(1) Wochenschr. f. Therapie des Auges, Aug. 13, 1903.

ing to Darier[1], a drug capable of replacing homatropin and euphthalmin. Darier concludes his article as follows: Bromid of methyl-atropin is a valuable adjunct to atropin in that it lacks certain inconveniences of the latter drug and it possesses new qualities. In increased and repeated dosage it has the same action on the iris and ciliary muscle as the sulphate of atropin. In medium doses (one per cent strength) the mydriasis produced by it may last slightly more than twenty-four hours, while the resultant paralysis of accommodation lasts but a few hours' time. In weak doses (one-half per cent strength) combined with one per cent strength of cocain, mydriasis alone is produced.

Acoin-Cocain Anesthesia. W. Krauss[2] has used the following *solution for local anesthesia* for the past two years:

Acoin	0.025	(grain .4)
Cocain	0.05	(grain .833)
Sol. sod. chlor. 0.75 per cent, ad.	5.0	grains 75)

As the mixture readily decomposes and loses its effect, it must be made every three or four days. It is injected subcutaneously or subconjunctivally in three or four places about the seat of operation, about 0.2 c.c. being used for each point. The anesthesia is usually sufficiently complete, even in very sensitive patients, and does not produce much swelling of the tissues. The effect is almost instantaneous, so that operations may be started very soon after the injection. No decided delay in the healing process has been noted. It has been employed successfully (1) in *enucleations,* where narcosis is impossible. Usually the injection of a syringeful around the attachments of the rectus muscles is sufficient, although morphin should be given before the operation, to prevent the momentary pain experienced in cutting the optic nerve. In a number of cases in which the method was tried no bad effects were seen. (2) In *strabismus operations* in children, or very sensitive adults. (3) In *operations upon the conjunctiva of the eyeball and eyelids,* such as the removal of chalazia, etc., and to prevent the pain of subconjunctival injections of salt. Also in the otherwise very painful rolling operation for trachoma. In this case it is injected beneath the conjunctiva, near the fornix, and about one and one-half syringefuls are required for the two eyes. (4) In *operations on the skin surfaces of the eyelids*—transplantation of the cilia, ptosis operations, extirpation of growths, etc. (5) In *operations on the lacrimal apparatus*—removal of the lacrimal gland and sac. In the latter, in addition to the subcutaneous injection, a deeper one is made between the medial wall of the sac and the periosteum. In this way not only the skin incision and removal of the sac from its bed are borne without especial pain, but the curetting out of necrotic pieces of bone, which is occasionally necessary, is made endurable. The effect can be increased by sponging the wound with cotton dipped in cocain solution. (6) In occasional operations in the vicinity of the eyeball—such as the *removal of extensive dermoid cysts.*

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(1) La Clinique ophtal., Nov., 1902.
(2) Münch. med. Wochenschr., 34. 1903.

Cocain. Fuchs[1] calls attention to some of the *therapu-tic uses of cocain,* at the same time reminding us that it is not always a harmless agent. When using it for either operations or removal of foreign particles from the cornea he makes the patient keep the lid closed. In operations upon the lids he injects the cocain under the skin and when operating upon the muscles he injects it into the conjunctiva. Even in operations upon chalazia he injects the cocain right into the chalazion. He uses it in the photophobia seen in phlyctenular conjunctivitis and keratitis. He does not allow the patients to use it but applies it himself. He has noticed that the photophobia will soon disappear if he can get the children to keep the eyes open for a short time every day for a few days and this he accomplishes by instilling a few drops of the cocain into the eyes in the morning when the photophobia is usually most intense. This will enable the little patients to keep the eyes open for half an hour or even longer. This seems to break the spell, so to speak. [The experience of Fuchs ought to modify the precept and example of those who furnish cocain mixtures for home treatment. The Editor practically never gives a prescription containing cocain to a patient, either public or private. Its application is reserved for office, dispensary and hospital use. After instillations of even weak solutions into the conjunctival sac

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(1) Wochenschr. f. Therapie des Auges. Jan., 1903.

the eye is always kept closed for 20 minutes, so as to avoid possible ill effects upon the cornea.]

Pneumococcus Serum. Axenfeld[1] highly recommends the use of Römer's *pneumococcus serum in ulcus serpens,* and as a prophylactic in operations where the local conditions are not good, or where general physical disturbance, such as diabetes, makes the risk of infection greater.

Subconjunctival Injections of Sodium Iodate. Schiele[2] has used solutions 0.1 per cent in strength (not boiled, but frequently renewed) to which from one to three drops of a *1 per cent solution of acoin* were added for each syringeful, in order to make the injections painless. The conjunctiva was first made anesthetic by instillation of cocain, or cocain and atrabilin. Pain after the injections was either very slight or entirely absent. No edema of the conjunctiva or swelling of the eyelids was seen in any case. As a rule the injections were made far back from the cornea, as Darier recommends, as he considers this an important point, and care was taken, by the use of a loupe, to avoid injuring any of the large conjunctival vessels. No adhesions between the conjunctiva and sclera, or necrosis of the tissue were observed. These injections of a full syringe of 1-1000 sodium iodate solutions were repeated not oftener than every three or four days, and were used in iritis, cyclitis, keratitis, secondary glaucoma, and panophthalmitis, with very marked relief of pain. The pain was decidedly diminished within a few hours, and either disappeared entirely or was very slight afterward.

In all forms of iritis good results were obtained, both in the acute stages and in chronic conditions. Contrary to Darier's belief, he found no contraindication to the injections even in the most violent cases of iritis. In acute and chronic cyclitis, chorioiditis, and inflammatory conditions of the cornea, there was marked improvement. The iodate was found to be a much more active preparation than the iodid. It acts (1) as an *indirect lymphagogue* by dilatation of the blood vessels of the eye; (2) as an *indirect antiseptic* by dilating the blood vessels and causing an increased quantity of blood to enter the eye; (3) as a *direct*

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(1) Klin. Monatsbl. f. Augenheilk., Feb., 1903.

(2) Archiv f. Augenheilk., July, 1903.

antiseptic as the "free iodine prevents infection of a wound, gets rid of any infection already present, retards the active escape of the white corpuscles by paralysis of their protoplasm, allows the formation of healthy granulation tissue by preventing decomposition, and quiets the exposed nerve filaments by direct paralysis of their axis cylinders"; (4) as a *specific in syphilitic and rheumatic diseases of the eye;* (5) as an analgesic in the highest sense of the term.

Experiments on the Action of Subconjunctival Injections are reported by Wessely[1]. He doubted the alleged action of subconjunctival injections as being due to lymphagogic influence and attraction of leucocytes. By experiments on rabbits he found (1) that the injected solutions were rapidly diluted from transudations of water from the conjunctival blood-vessels. A 5 per cent solution of sodium chlorid, *e. g.,* contained only three-quarters per cent after half an hour. Very little of the substances reached the interior of the eyeball. After subconjunctival injections of 1 c. c. of a 20 per cent solution of ferrocyanid of potash the aqueous contained 1:1000, the vitreous 1:2,000,000. (2) The subconjunctival injections do not accelerate the osmotic current of the anterior chamber, but act on the ciliary vessels, apparently through reflex, just as mechanical irritations of the conjunctiva in such a way that the aqueous humor, otherwise almost free from albumin, will now contain albumin, up to 1 per cent. Thus they are nothing but a strong irritant, which, through hyperemia and its consequences, may convey to the eye the protective substances of the serum in large quantities. Therefore they would be practically indicated in chronic conditions lacking sufficient inflammatory reaction.

The present status of *subconjunctival injections* in ophthalmic therapeutics is presented by C. S. Bull[2]. He concludes that the efficiency of these various solutions injected beneath the ocular conjunctiva cannot be ascribed to the increased local acceleration of the lymph-currents, the so-called leucocytosis, nor to the antiseptic action of the remedies employed, since the presence of such processes cannot be demonstrated in the tissues of the eye following the injections. The chief change seems to be in the composition of the aqueous humor. The latter becomes hemolytic and richer in albuminoids from the irritating action of the injections which cause congestion and increased transudation, from the blood-vessels, of albuminoids with which, it is now known, the protective substances of the blood are always found.

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(1) Deutsche med. Wochenschr., 7, 1903.

(2) Medical Record, July, 1903.

Bull has used this method in many cases during the past three years. Sodium chlorid, sublimate, mercuric cyanid, and hetol of varying strength were tried. No important differences in mode of action or effect were seen between salt solutions and those of mercuric cyanid, so highly extolled by Darier. The latter, even when cocain or acoin was added to the (1:5,000) solution before injection, always caused a great deal of reaction, severe pain, and conjunctival inflammation, and was followed by persistent chemosis and hypersensitiveness of the conjunctiva. *Hetol* (*sodium cinnamate*) was used in a 1 per cent solution, half a gram being injected, after cocain, at first every other day. It seemed to influence favorably the course of the disease in herpes and interstitial keratitis, to be of benefit in hastening absorption in acute uveitis, and to be of no use in chronic cases, notably in scleritis. Bull believes that this method does not bring about any more rapid or favorable results than those we have hitherto employed in affections of the cornea, uveal tract, or retina. In orbital cellulitis of an infective nature, however, bichlorid (1:1000) did exert a very favorable and unusually rapid effect in hastening the suppurative stage.

Locenius has been trying *subconjunctival injections of hetol* for some time in the St. Petersburg Eye Clinic. He first cocainizes the eye and then injects under the conjunctiva 0.5 c. c. of 1 per cent solution of cocain. There is always more or less pain which lasts from one to two hours and is followed by a feeling of comfort. Generally speaking in addition to the injection of hetol the proper constitutional treatment was employed and when necessary atropin. In *lupus* and in *keratitis* dendritica there was a hastening of the healing process and diminution of pain. *Corneal ulcers* were always benefited when there was no collection of pus in the anterior chamber. In injuries of the cornea it soothed the pain. The course of parenchymatous keratitis was greatly shortened and the danger of iris complications much lessened. In pannus in combination with atropin it is an admirable alleviator of pain. In inflammation of the uveal tract it is most valuable, as it stimulates the lymph circulation and in this way helps to bring about the absorption of the clouding in the media. Purulent inflammation of either cornea or uveal tract are contraindications for the use of hetol. In *episcleritis* it eases the pain and promotes the absorption of the corneal cloudings.

Protargol. Ruffel[1] has employed protargol in eight hundred cases and has found it to be a most active agent in the treatment of conjunctival affections which are combined with abundant catarrh. In dacriocystitis he has obtained the best results by instillation of the drug in from ten to twenty per cent strength solutions followed by massage of the canaliculi. In moderate and mild cases of ophthalmia neonatorum the drug may be made to replace nitrate of silver and may completely take the place of the latter material in the employment of Créde's method. He has found that a ten to twenty per cent solution of protargol is equal in action on the gonococcus to a two per cent solution of nitrate of silver, while its action is more lasting and less irritating.

[The Editor has found *argyrol,* in the same dosage and employed for the same purposes as protargol, more effective and no more irritating than the latter salt.]

Argyrol. This so-called *silver vitelline* is recommended by A. Alt,[2] as a substitute for argentic notrate. He has used it in 5 per cent solution in a number of cases of chronic and subacute conjunctivitis, and in cases of trachoma after the removal of the granular tissue. It is non-irritating, causes no pain, and in every case its application has brought about a visible improvement. He has not used it long enough to know whether and in what time it is likely to cause argyrosis; but, on account of its

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(1) La Clinique ophtal, Nov., 1902.
(2) Am. Jour. of Ophthalmology, Oct., 1902.

extreme solubility it may perhaps be less likely to bring on this disagreeable discoloration of the conjunctiva.

Sundry Silver Salts. Paul Meyer[1] has been using the salts of silver known as *itrol* (argent. citricum) *aktol* (argent. lacticum) and *collargol* (argent. colloidale Credé). *Itrol* is soluble with difficulty in water and is valuable for dusting over wounds, acting as a non-irritating antiseptic. *Aktol* is very soluble and is very valuable for making antiseptic solutions. Itrol is used particularly in infected wounds of the lids, conjunctiva and orbit, and is blown in with an insufflator. Good results almost always followed, even in infected wounds of the eyeball, when this product was blown into the wound. In fact, in all the commoner infectious external diseases itrol was found useful, with the exception of the tuberculous inflammations. Some pain is often felt and this is due to the mechanical effect of the insufflation. Insufflation is necessary, however, as we must get penetration. Cocain may be employed to allay this pain. It is advisable to use fresh itrol and the variety which is especially suited to eye affections. The chief value of this so-called silver therapy consists in the local and generally speaking harmless action, which may be utilized not only as an operative antiseptic but also for fighting inflammatory conditions. Chlorin water and iodoform have been supplanted by itrol, collargol and aktol, and he advises their use even in cataract extraction, and iridectomies as a means of disinfecting the conjunctival sac.

Electric Heat. Maddox[2] has found that the best method of *applying artificial heat to the eye* is by means of a half to a seven-tenths ampere current passed through a very fine wire which is wrapped around a roll of canton flannel. The current, he says, can be taken from an ordinary lighting wire and controlled by a transformer. The employment of dry heat he believes is especially indicated in rheumatic affections of the eye and in certain forms of glaucoma. The indications for the use of dionin are still unsettled. As a rule the drug should be employed when heat is indicated, while adrenalin is useful when cold is the more applicable.

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(1) Centralbl. f. pkt. Augenheilk., Feb., 1902.
(2) La Clinique ophtal., Dec. 10, 1902.

[Over three years ago the Editor exhibited at one of the meetings of the Ophthalmic Section of the Am. Med. Assoc'n an *electric hat-iron,* which he used in the manner suggested by Maddox. This appliance can be purchased at most dealers' in electric supplies and is a handy and effective means of applying dry heat to the ocular region.]

NEW INSTRUMENTS AND APPLIANCES.

A New Electromagnet for the Extraction of Magnetic Foreign Bodies from the Eye has been devised by P. H. Schenkel.[1] In order to give the magnet various directions without changing the positions of the magnet or eye, the author constructed pole ends which move in ball and socket joints. He also made one tip curved, to avoid interference by the nose. The magnet is 55 cm. long, 90 mm. thick, surrounded by insolated copper wire of 3 mm. diameter.

[Dr. Schenkel's giant magnet can be had from Meyrowitz, New York, who will send a full description of it on request.—ED.]

The Siderophone, a new instrument for discovering iron splinters in the eyeball, is described by Widmark[2]. Though the sideroscope and the x-ray apparatus are extremely useful in locating iron splinters in the eyeball and thus increasing the chances of extraction by the magnet, each has its inconveniences: The sideroscope must be carefully placed in a separate room, is greatly influenced by the neighborhood of electric currents, and is expensive. The x-ray outfit is also expensive and the patients must be sent to studios to be specially photographed. Dr. Martin Jansson, of Sweden, has constructed a cheap, simple and efficient instrument on the principle of Hughes' induction scales.

The siderophone consists of two cylindrical-shaped pieces of iron, united by a frame work of ebony, and placed so that the smaller piece is at right angles to the larger. The latter is surrounded by a middle-sized copper wire, which is connected with a small Helesen's dry element, fitted

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(1) Deutsche med. Wochenschr. 51, 1902.
(2) British Med. Jour., Nov. 1, 1902.

with an interrupter. The smaller piece of iron is surrounded with very fine copper wire, which leads to a common telephone trumpet.

When the electric current from the dry element is closed and the interrupter acts, the larger piece of iron becomes magnetic, and again influences the smaller piece of iron. This induces a current in the copper wire by which it is surrounded, and this secondary current is led to the telephone trumpet, where it is heard as a sound by the ear.

Now the smaller piece of iron is placed so that the axis of the larger piece divides it carefully in half. Thus two electrical currents of different directions arise which meet in the telephone; if these currents are equally strong, they neutralize each other, and there is no sound to be heard in the trumpet; but if the end is approached to the smallest iron splinter, the current is increased in the corresponding half. A sound is then produced in the telephone trumpet.

The adjustment of the instrument is made by a screw, which contains a small iron splinter. At a certain position of the screw the two currents are equally strong. If it is unscrewed, the current at the opposite end is stronger. The instrument is most sensitive when the above-named side is slightly overbalanced.

A New Portable Perimeter is described by J. T. James[1]. The instrument consists of (1) two sliding tubes of brass uprights, one for the arc, the other with a chin-rest; (2) the arc, made of three pieces of aluminum tubing, forming a quadrant with a radius of 33 cm.; (3) the test-object carrier consisting of a disc with an aperture 5 mm. square, behind which another carrier rotates; (4) a thin metal disc three and a half inches in diameter for the chart. The carrier itself is moved round the arc by means of a steel wire ten inches long in the observer's hand. The distance of the patient's eye from the fixation point is measured by means of a steel rod 33 cm. long which can be made to impinge on the patient's cheek when the chin-rest is to be dispensed with. The instrument is very useful for examining the visual field in patients confined to bed, fits into a wooden box, ten inches long, four and a half wide, and two deep, and weighs very little.

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(1) The Lancet, Aug. 1, 1903.

A Simple and Convenient (modified Greeff's) Method for the Mounting of Macroscopic Specimens. H. McI. Morton recommends: First: Harden the fresh specimen in 10 per cent formalin for from two to four days. Second: Cut the eye as you desire to mount it. If to show the posterior or anterior segments, cut equatorially and if to show the lateral or longitudinal eye, cut meridianally. Third: Wash in distilled water for ten minutes. Fourth: Dry the specimen carefully with cloth (if it is desired to remove the retina, this may be done with a cloth or a small brush). Fifth: Make the eye fast to the back of the glass mounting jar with gelatin (simply mix the gelatin with a little water and heat slowly for a few hours or over night). Sixth: After the specimen is fixed to the posterior wall of the cell let it dry for two or three minutes until sure it is well attached. Seventh: Fill the glass jar with 10 per cent (or even 4 per cent) formalin in watery solution. Eighth: After very thoroughly dry-

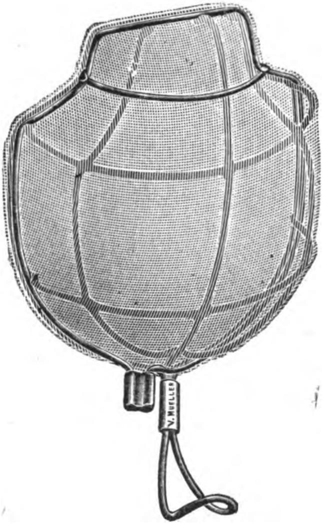

Fig. 20. The Jordan Inhaler.

ing the top of the cell fasten it down with gutta-percha cement. One may also cement a small clasp on the top of the glass jar to hold the label. Ninth: Paint about the edges and over the gutta-percha with white (or any color) paint.

[The Editor, as chairman of a special committee of the Am. Med. Assoc'n., has published, in a recent number of the JOURNAL, a complete review of the methods of preparing, mounting, photographing and preserving gross eye specimens. The views of various pathologists on these subjects are therein given, together with short articles from their pens.]

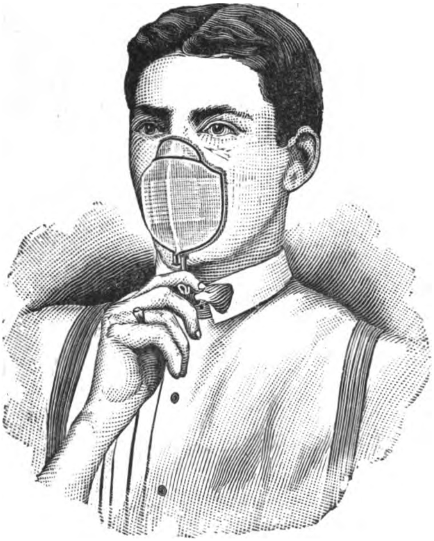

Fig. 21. The Jordan Inhaler in Position.

Improved Amblyoscope. Nelson M. Black, Milwaukee, has observed that a very desirable improvement could be obtained by adding to the Worth Amblyoscope a vertical adjustment. It was also found there was room for improvement in the pictures, and the old cheap pictures on glass have been discarded, and in their place are used lithographs on translucent celluloid. By means of the plates so printed, the vision of the better eye may be lowered to that of the other, if the difference is slight, by placing the imprint face out on that side; or, if more reduction is necessary, by placing the blank celluloid disc, which is found in the set, before the picture.

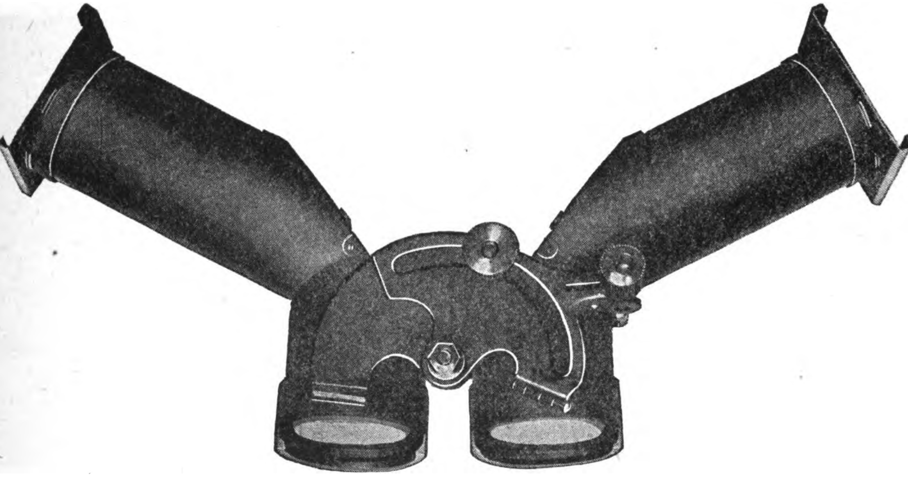

Fig. 22. Black's Modification of the Worth Amblyoscope.

Binocular single vision is obtainable with this instrument in a convergence of 60°, a divergence of 30° and a vertical deviation of 18° above or below the horizontal plane, thus accommodating itself to almost any degree of squint to be met with.

The object slides are made up in three series, *first those to stimulate binocular vision,* as the bird and cage, the clock-face and hands, the cross lines and the circle and square. The second series require fusion to produce the picture parts of each being on each object glass; the third series consists of stereoscopic pictures which, when combined, give an impression of the third dimension.

For the information of those who are not familiar with the original instrument the following instructions are given by Black and Worth: The child with his correction on is held on the surgeon's knees and the Amblyoscope roughly adapted to his degree of deviation; it is then held before the child's eyes and an electric lamp is put in the axis of each tube about four feet away. By a simple mechanical arrangement, each lamp is easily brought nearer to, or put farther away, from the tube which it illuminates. A slide showing a cage, for instance, is put in the tube before the child's fixing eye, and a bird in that before the squinting eye, and the child is told what to look for. The lamp before the fixing eye is then taken farther away, and that before the squinting eye is brought nearer until the child sees the bird. By this time he has lost sight of the cage. The intensities of the illuminations are then adjusted until the child sees both the bird and the cage. The child is then allowed to grasp the instrument, and, assisted by the hands of the surgeon, is taught to vary the angle of the instrument so as to make the bird go in and out of the cage. Other similar pairs of slides are shown. The average child of 3½ or 4 years of age takes a very keen interest in the game which he imagines has been devised merely for his amusement. Slides which require a true blending of the images are then shown. After a time, it is often found that the angle of the instrument may be altered to a very considerable extent, either in convergence or divergence, while the eyes follow the objects and maintain fusion of the pictures. One often gets a powerful "desire" for binocular vision in these young subjects with surprising facility. The next step is to equalize the intensities of the lights. This may usually be done at this stage without a return of suppression. In many cases, one is able to deviate the two halves of the Amblyoscope more and more at each visit until parallelism of the visual axes is obtained. In other cases operation may be necessary. If, then, the eyes are placed approximately straight, the desire for fusion will fill up any slight gap that may remain. However the actual remedying of the deviation may be effected, if the child has this powerful desire for fusion, which can only be acquired in early childhood, a perfect cure of the squint results.

Fusion training with young children must be carried out by the surgeon himself. If the child be young enough a very powerful desire for fusion may usually be created in five or six lessons, given at intervals of one week, after that visits once a month are quite sufficient to preserve the newly acquired faculty of fusion, while the vision of the usually deficient deviating eye is being stimulated to better work by a bandage over the better member, or atropin instilled into it.

Chloroform Inhaler. A new *chloroform inhaler for eye operations* has been devised by P. A. Jordan[1]. The need of an inhaler which would not contaminate the wound and which would give an unobstructed field for operation, prompted the present modification of the commonly used inhaler.

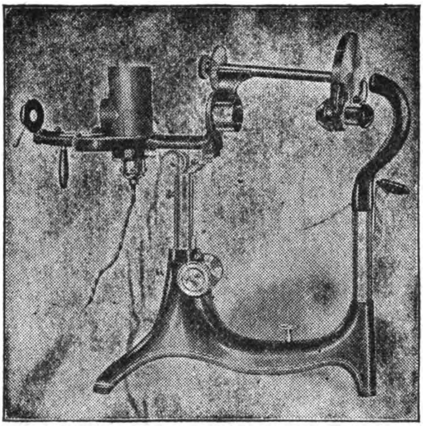

Fig. 23. The Geneva Retinoscope-Ophthalmoscope, as a Skiascope.

It is small in all diameters, being 4x2¼x1½ inches; the handle instead of pointing upward over the forehead, extends over the chin. The part of the mask covering the nose is shaped so as to fit the contour of the nose closely at its tip, arching inward on either side, then outward and downward over the mouth in the usual manner. By closely fitting the face it is not easily shaken off by the tossing, semi-conscious patient when being anesthetized.

It may be used for administering ether from a drop bottle after inlaying the gauze pieces with cotton.

Its advantages are:

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(1) Ophthalmic Record, Nov., 1903.

1. Affords a large clean field for operation about the eye.
2. Adheres to face without holding, better than ordinary inhaler.
3. Is applicable to anesthetic for any kind of operation as well as on the eye.
4. May be used for giving ether.
5. Affords better field for view of bystanders in clinic operations.

A Double-Hand Skiascope has been invented by J. E. Jennings[1]. It consists of two aluminum frames, one holding eighteen pairs of convex lenses and the other eighteen pairs of concave lenses. Each frame is 19¼ inches long and 6¾ inches wide, with an opening 17x1 inch down the middle to accommodate the nose when the skiascope is held in position.

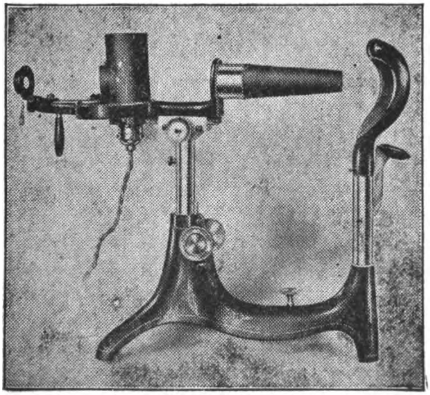

Fig. 24. The Geneva Retinoscope-Ophthalmoscope, as an Ophthalmoscope.

In using the skiascope the frame containing the convex or concave lenses, according to the case, is held firmly in both hands by the broad edges, with nose through the opening and eyes accurately centered behind the upper or weakest pair of lenses. After each eye is tested, the patient shifts the instrument up until he looks through the

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(1) Ophthalmic Record, July, 1903.

next stronger pair of lenses, and so on until the examination is completed.

The essential advantages of the instrument are: 1. Both eyes may be examined before moving the instrument. 2. The skiascope rests against the forehead, sides of the nose, lips and chin so that the lenses are as accurately centered as is possible with the best fitting trial frame. 3. This accuracy is further assured by the instrument being held at the side with both hands. 4. The space usually occupied for a handle is utilized for an additional number of lenses. 5. It has more than twice the number of lenses found in any other skiascope. 6. The shape and position of the lenses adapts it for use with children as well as grown patients; the pupillary distances ranging from forty-five to eighty-five mm.

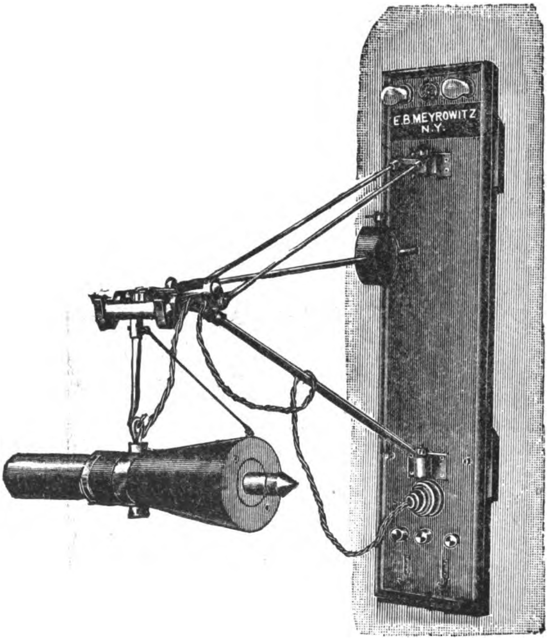

Fig. 25. The Volkmann Electromagnet.

A combined retinoscope and ophthalmoscope is manufactured by the Geneva Optical Co. The Editor believes the skiascope portion to be useful and of more value to the ophthalmologist than the ophthalmoscope. The latter is available for the indirect method only, but he has found it of much service in teaching. A large class (using several instruments) can be quickly and effectively taught to appreciate the fundus landmarks in normal eyes and gross lesions in pathologic cases. The examination can be made in a fairly well lighted room, no absolutely *dark* chamber being necessary, a consideration of importance in dealing with a roomful of students.

Giant Magnets. A goodly number of these have been put on the market by opticians and others during the past year—several of them presenting special advantages. A most useful example is the Volkmann magnet, well known in Europe for its small size, and great electro motive force. A cut of the instrument is given in the text.

THE EAR.

THE EAR.

Anatomy. E. Jurgens[1] has conducted a series of investigations regarding the development of the ear, and offers the following conclusions:

1. In the first and second year the mastoid process is always compact.
2. The squamoso-mastoidal suture is always patent up to the second year.
3. The length of the drum membrane is not greater than the breadth, up to the fourth month. From the fourth month on, the length is greater than the breadth.
4. The vertical and horizontal diameters of the auditory meatus do not change in the child proportionately in the various periods. Individual variations may occur.
5. In all periods, of the four walls of the external meatus, the lower one is always the longest; then comes the anterior; the posterior; and, as shortest, the upper.
6. The dimensions of the ossicles are alike in the child and the adult.
7. There is a certain connection between the largest diameter of the external auditory meatus and the greatest diameter of the skull in the child.
8. There is no connection in childhood between the great diameter of the skull and the greatest diameter of the drum.
9. On comparing the following conditions, there is no connection between the growth of the child, the fronto-occipital of its skull, the walls of the auditory canal and the drum membrane.
10. In the new-born the lower wall of the external auditory canal does not form an angle with the drum membrane. This is formed in the third month of life.
11. The upper wall of the external auditory canal and

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(1) **Archives of Otology, October, 1903.**

the drum membrane in the fetus are situated on a level. After birth an angle is formed between the two which in the child is always greater than in the adult.

12. The angle of inclination of the drum membrane exists in the new-born, and gradually increases with age.

13. The angle formed by the lower angle of the canal and the anterior margin of the drum increases in extra-uterine life with the age of the child.

14. The angle of declination of the drum membrane changes in the child in general inversely proportional to the age.

EXAMINATION.

W. L. Ballenger[1] thinks that *functional hearing tests are important,* not only to the specialist, but to the general practitioner as well. Functional hearing tests are to the otologist what the ophthalmoscope is to the oculist and the stethoscope is to one skilled in diseases of the chest. He gives three major principles and a number of secondary principles upon which functional tests are based.

First Major Principle.—*The range of hearing in adults* under 55 years of age is approximately 16 to 48,000 vibrations per second. After the fiftieth or fifty-fifth year the hearing for the upper tones is somewhat reduced, as has been shown by Zwardemaker, Bezold and others. The very aged do not, as a rule, hear tones higher than 37,000 vibrations per second. This should be borne in mind, as the case might otherwise be mistaken for one with labyrinthine deafness.

Under the first major principle may be grouped two secondary principles which only serve the purpose of elaborating or elucidating it. They are as follows:

(*a*) Anything which disturbs the normal tension of the drum-head and ossicular chain will diminish or abolish the hearing for two or three lower octaves.

(*b*) Any disease affecting the perception apparatus will diminish or abolish the hearing for the upper tones of the range of hearing.

Second Major Principle.—*Hearing by bone conduction*

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(1) Journal American Medical Association, April 11, 1903.

is approximately one-half as long as hearing by air conduction.

This rule is subject to considerable variation in normal ears, but for practical purposes in the study of these principles we do not need to make a closer analysis. The point to be borne in mind is that hearing by air conduction is longer than by bone conduction.

The second major principle may be still further elaborated or elucidated by two secondary principles, namely:

(*c*) Hearing by bone conduction is increased in those affections of the middle ear which disturb the normal tension existing between the drumhead and the ossicular chain.

(*d*) Hearing by bone conduction is diminished or abolished in affections of the labyrinth or perception apparatus.

Third Major Principle.—*The intensity of hearing by bone conduction* is either increased or diminished by morbid conditions within the middle ear or labyrinth. Two secondary principles may be given in this connection, namely:

(*e*) Any disturbances of the normal tension existing between the drumhead and ossicular chain will increase the intensity of hearing by bone conduction.

(*f*) Any disturbance of the perception apparatus will diminish the intensity of hearing by bone conduction.

AUDITORY CANAL.

Moutard-Martin[1] reports a case of *rudimentary development of the left auricle with absence of the auditory meatus* and left-sided deafness. The left side of the face and skull were insufficiently developed.

Wilson[2] reports a case of *recovery from an epithelioma of the auditory canal.* This patient, 28 years of age, was first seen in March, 1900. A nodule was removed from the posterior wall of the right canal. It recurred in January, 1901, was removed a second time, and in April, 1902, recurred again. Microscopic diagnosis by three pathologists was epithelioma. Since April, 1902, the patient has

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(1) Arch. internat. d'otol., page 403.
(2) Archives of Otology, 1903.

been treated with the x-ray; between fifty and sixty applications have been made, the average being two a week. He had examined the case after each application, and he had never seen the slightest reaction on the part of the tympanum. Under this treatment the growth had shrivelled up and disappeared two months ago. There were absolutely no unpleasant effects, and up to the present time there had been no signs of recurrence. Hearing normal.

W. C. Braislin[1] removed a tumor of the auditory canal which he calls a *teratoma.* The growth completely filled the canal and was covered with skin. In removing the tumor an incision was made behind the ear and the soft tissues drawn forward, exposing the canal. The growth was found to be encapsulated and attached to the posterior wall. It was dissected out and the skin covering the tissues was pushed back against the posterior bony wall of the canal and held in position by gauze packing. The tumor on cross section appeared to be studded with small, white fibrous granules of cartilage. The microscope showed the presence of cartilage, myxomatous tissue, and abortive glands, making the diagnosis of teratoma probable.

M. A. Goldstein[2] reports a case of *spontaneous bilateral hemorrhage from the ears* in a woman 22 years of age. A careful analysis of the fluid showed it to be of a serous character mixed with blood. After studying the case from every possible standpoint he became convinced that the patient was not a malingerer, and that the hemorrhage was independent of the menstrual function, and that it was caused by some vaso-motor disturbance due to hysteria.

Goldstein considered the case of sufficient interest to refer it to a number of specialists for their opinions as to the etiology. His method of eliminating the question of malingering is worthy of consideration:

1. The most careful inspection of the auditory canal and tympanic membrane failed to reveal any evidence of the parts having been tampered with.
2. The very character and constituence of the fluid was proof against it. The fluid was not blood, nor did it coagulate.

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(1) Brooklyn Medical Journal, July, 1903.
(2) Laryngoscope, August, 1903.

3. On at least six occasions, after having wiped the canal dry, and while patiently inspecting the area, the fluid suddenly welled up in the fundus of the canal. One of the unusual features associated with the determination of the source of this bleeding, was his inability to locate the exact point from which the fluid entered the auditory canal. Having in mind the distal ceruminous glands as a possible source of this exudation, his inspection always included this area and he says positively that the fluid welled up from points farther remote than the most distal ceruminous glands. On wiping away the exudate (usually about 1 c.c. in volume), he could determine a moist, reddish, glistening line along the posterior circumference of the membrana tympani, extending from a line with the short process of the malleus, to the floor of the canal. This line always appeared about the same length, and in the same position at each inspection.

4. He does not offer his own testimony alone as to the sudden welling up of this sero-sanguinolent exudate in the ear, but submits as corroborative evidence the observations of Drs. Todd, Shapleigh, Buckwalter, Klokke, and Würdemann, all of whom saw this exudation at different times.

5. As an additional measure to exclude simulation, he proceeded to seal the affected ear in the following manner: The external auditory canal was thoroughly cleaned and dried, and then lightly filled with sterilized cotton which had been previously colored blue, and which was inserted into the ear without the patient's knowledge as to the change in color of the cotton. A small tampon of white sterilized cotton was placed over this, the entire concha filled with cotton, a piece of gauze shaped to the concha, and the whole dressing fixed with collodion. This dressing was retained in position for twenty-four hours. When removed, all of the dressings were still in the position in which they had been arranged, and were saturated with the exudate.

After exhausting all therapeutic measures he decided upon suggestion of a radical kind. The patient was placed in a hospital and assured that an operation was to be done which would permanently cure the ear.

Chloroform to primary anesthesia was administered, the auditory canal was dried out and lightly packed with a narrow strip of gauze and with a small pledget of cotton, the entire head enveloped in sheet wadding and a heavy plaster-of-paris bandage applied, enveloping the head and neck. The patient was kept in a recumbent dorsal position and carefully watched for forty-eight hours. The fixed dressings were then cut away, and when the gauze was removed from the affected ear there was no evidence whatever of recurrence of the exudate.

A stiff crinoline bandage was then applied for forty-eight hours, and renewed daily for one week. At the end of that time the dressings were removed entirely and the patient pronounced cured. There has been no sign of recurrence of this exudation to date (a period of six weeks).

Another corroborative evidence of the hysterical nature of this neurosis is the present condition of the hearing. Throughout the period of exudation, there was total deafness in the affected ear; to-day there is Rinne positive and the hearing for the watch 20-40.

MIDDLE EAR.

Acute Otitis Media. L .Wolff[1] calls attention to the *apparent contagiousness of acute otitis media.* He is of the opinion, however, that when a number of cases occur in the same family or in the same school, they are due to a common cause and not infected from one another. He reports three cases occurring in the same family. The oldest of these, following a severe cold (influenza), suffered from a double otitis with high fever. One week later another brother began to suffer from a double otitis with severe symptoms, and on the next day, the youngest brother was taken ill with the same affection. After paracentesis, all three children recovered completely in the course of a number of weeks.

E. B. Dench[2] says an acute middle ear suppuration is invariably caused by the *introduction of some pathogenic germ into the tympanic cavity.* This germ gains entrance

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(1) Archives of Otology, April, 1903.
(2) Med. News, Jan. 13, 1903.

either through the external auditory meatus, there being a solution of continuity in the drum membrane, or through the Eustachian tube, the drum membrane remaining intact. The most simple avenue of introduction, and at the same time perhaps one of the most unusual, is through the external auditory meatus.

The middle ear is most commonly infected through the Eustachian tube. Bacteriologic investigation of the secretion from the nasopharynx in healthy individuals almost always shows the presence of a certain number of pathogenic bacteria.

It will easily be seen that an acute suppuration of the middle ear must necessarily be a not infrequent complication of any acute infectious disease, particularly of those diseases in which pathogenic germs are found in large quantities in the nasopharynx. From a clinical point of view one of the most common etiologic factors is the direct introduction of pathogenic germs through the Eustachian tube by the insufflation of water through the nares. This occurs most frequently as an accident during bathing, but may follow the use of the nasal douche, too often advised by the medical attendant. Here, again, the predisposing factor plays an important part. It is probable that in many instances, water that is not perfectly sterile has entered the middle ear, and has failed to cause any inflammation whatever. This accident, however, if associated with one of the local predisposing causes already mentioned, is almost certain to be followed by serious consequences.

We may frequently have an acute catarrhal inflammation of the middle ear which may run its course without producing suppuration. Even in those cases which go on to rupture of the drum membrane, the discharge is seromucous in character, and disappears in the course of a few days. An examination of this discharge invariably shows that the pathogenic organisms are of the milder variety, such as the staphylococcus or some of the less virulent form of diplococci. When we have to do with a streptococcus and, in a great majority of cases, with a pneumococcus infection, the upper part of the cavity is almost always involved. It should also be remembered, in considering the pathology of the condition, that a simple acute catarrhal otitis, in which the infective germ is of low vitality, or in which the bacteria are only present in small numbers, may easily be transformed into acute suppurative otitis media, involving the upper portion of the tympanic cavity, unless proper measures are taken, such as keeping the parts absolutely sterile to prevent any infection from without. We see this especially in hospital practice, where the patients are not as cleanly as they might be. A patient, presenting at first with an acute catarrhal otitis media will appear later on with this transformed into an acute suppurative otitis media, involving the upper portion of the tympanic cavity, the change in the case being entirely due to infection of the middle ear through the external auditory meatus.

J. L. Morse[1] calls attention to the frequent *mistakes made in the examination of infants.* No physical examination in infancy in which other definite signs sufficient to account for the symptoms are not found should be considered complete without an examination of the ears. Many awkward mistakes would also be avoided if they were examined even when the signs of other conditions are present.

Many physicians seem to think that inflammation of the middle ear is always associated with earache, and hence if there are no evidences of earache they do not consider the ears at all. This view is certainly not justified. Many infants with acute inflammation of the middle ear show no signs of pain at any time, and many others who evidently have pain somewhere show nothing by their actions which will direct the attention of the physician to the ear. It is a common impression that putting the hand to the ear means earache. It sometimes does, but more often does not. All sick babies are very likely to wave their arms about, grab at their ears and pull their hair. Apparent tenderness on pressure over the mastoid is another unreliable guide. Tenderness over the mastoid is unusual anyway, in simple acute inflammation of the middle ear, and on the other hand, most sick babies will cry if firm pressure is made on any part of their body. The only way to determine satisfactorily whether or not there is

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(1) Journal American Medical Association, July 18, 1903.

inflammation of the middle ear is to examine the ear with a speculum; all other methods of examination are incomplete and necessarily misleading. The examination of an infant's ears is not a simple matter and requires considerable experience. The results, however, are well worth the time required to master the technic. A smaller speculum than comes with most sets is necessary.

Acute inflammation of the middle ear is usually, but not always, associated with fever, which may be high. It causes many reflex symptoms, which are sometimes quite severe, convulsions not being very uncommon. These reflex symptoms very often attract the attention from the real seat of the trouble to some other part of the body. Meningitis, pneumonia, gastritis, worms, dentition and, in fact, almost every acute disease but the right one is suspected.

An acute primary inflammation of the middle ear is, however, probably more often mistaken for pneumonia than for any other condition.

Inflammation of the middle ear may develop in any of the diseases of infancy, as well as in those of the respiratory tract. They are especially common in conditions of malnutrition, whether or not due to diseases of the gastroenteric tract. The amount of reaction seems to depend a good deal on the general condition of the infant, being less marked in the feebler babies. It is not at all uncommon at the Infants' Hospital to have one-third or one-half of the babies with serious disturbances of nutrition develop middle ear inflammation.

In the treatment of acute earaches of young children, G. L. Richards[1] recommends the use of bougies made after the following formula:

Acidi carbolici	minims	7
Ext. opii fl	minims	6
Cocaini	grains	3
Atropini sulphatis	grains	3
Aquæ	minims	52
Gelatini	grains	18
Glycerini	grains	158

To make 42 bougies.

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(1) Journal American Medical Association, Jan. 24, 1903.

The bougie when prepared is either kept in a neutral powder like lycopodium or wrapped in tinfoil. To use, the lycopodium powder is washed off in warm water, or, if wrapped in tinfoil, they are dipped in warm water. The warm water aids in their solution. The bougie is then very slippery, and the affected ear being placed uppermost it can easily be slipped down into the external canal without the slightest discomfort to any child. Here the bougie soon dissolves, the anodyne is brought directly into contact with the inflamed surfaces and the pain is relieved. Besides being a medium for the exhibition of the opium, cocain and atropia, the glycerin is of itself distinctly curative, in that it tends to draw out serum from within and lessen the tension. A certain amount of osmosis takes place and there is absorption of the medicine contained in the glycerin. After insertion the ear should be stopped with absorbent cotton or gauze and a hot water bottle placed at the side of or over the ear. Even where paracentesis has been required, the insertion of a bougie immediately after the paracentesis is of great relief to the patient in lessening pain and withdrawing serum and has distinctly curative value.

Cases which have gone beyond an early stage are, of course, not relievable by this remedy, and demand treatment appropriate to the condition, whether paracentesis or otherwise; but many a case of acute earache will at once subside without going on to severe inflammation if promptly treated in this manner.

[In all acute pain in the ear not due to pyogenic infection the Editor finds prompt relief follows the use of 12 per cent carbolic acid in glycerin. A pencil of cotton wound on a delicate applicator is saturated and pushed gently with a slight twisting motion down against the drum membrane. The glycerin by its osmotic property relieves congestion; the carbolic acid by its anesthetic property helps to relieve the pain. The application may be repeated as often as necessary.]

W. G. Phillips[1] believes that a patient *suffering from acute suppurative otitis media should be confined to his bed* regardless of how well he may feel. It is not cus-

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(1) Med. News, Jan. 17, 1903.

tomary to consider such patients ill enough to be confined, but it should not be forgotten that a severe septic inflammation is in progress with elevation of temperature, rapid pulse and excruciating and exhausting pain. Confinement in bed aids greatly as an abortive measure as well as giving the proper rest and protection from cold. Preventive treatment may be further outlined by referring to the many and varied opportunities for forestalling the attacks. There are certain diseases and diseased conditions which surely predispose to them.

First and foremost is the presence of adenoid tissue in the vault of the pharynx. This tissue is a hotbed for the retention and development of infection and the victims are constantly menaced by the entrance of septic material into the open doors of the Eustachian tubes. Indeed, adenoid patients actually do have "running ears" in far larger proportion. It is obvious that all adenoid patients should undergo operation, but especially is this true in one who has had even a single attack of middle ear suppuration.

Ear complications of grippe can generally be prevented by careful treatment of the nose and nasopharynx at the very commencement, and during its entire course cleansing and detergent sprays, in fact, any treatment which tends to render these tissues clean and free from secretions, may be resorted to. Added to this the patients should be cautioned to avoid violent blowing of the nose—a procedure which, no doubt, often effects the introduction of infected material into the middle ear. Ear symptoms of more or less severity nearly always accompany the exanthemata, especially scarlet fever and measles, and suppuration often results.

That much may be done to prevent such suppuration and that but little is actually done by practitioners seems to be a fair criticism. These patients should receive the very same care as that already recommended for grip. Almost any detergent, non-irritating, alkaline spray will serve the purpose. A tablet made up of sodium salicylate, sodium bicarbonate, boric acid (aa gr. iijss), oil gaultheria q.s., dissolved in one ounce of sterile water has been found to be almost without irritating qualities. Free purgation, preferably by means of calomel, is a most helpful clinical adjunct, especially when administered at the very commencement.

For the relief of the excruciating pain during the time previous to the establishment of the discharge, not much can be accomplished aside from the use of heat and narcotics. If examination of the drum shows clearly that no pus has yet formed, the canal should be irrigated with large quantities of hot sterile water at half hour intervals. A large douche bag hung high enough to give sufficient force to the stream is probably the best method for hot water irrigation. The temperature of the water may be from 100 to 110 F. Added to this should be the internal administration of some form of narcotic which will be far less harmful to the patient than the prolonged excruciating pain. If the discharge has not actually commenced and the tympanic membrane is bulging or otherwise giving evidence of the presence of pus in the cavity, a free incision should be made. It requires some experience to make this incision properly, but incision is preferable to puncture. Such incision should be made under strictly aseptic surroundings and it should be carried not only through the attic region, but well out on to the wall of the canal. This serves to open freely both the tympanum and attic, and also to bring about a free flow of blood, thus greatly relieving the congestion. Many serious results may be avoided by resort to early incision.

After the discharge is established it is necessary to decide upon the course of treatment to be followed, and in so doing we should not forget that the chief requirements are cleanliness and free drainage—and cleanliness should refer to the nose and nasopharynx, as well as to the external ear and auditory canal. Frequent irrigation with a 1 to 4,000 sterile solution of bichlorid of mercury, thoroughly cleansing the canal of all discharge, using one to two quarts at each treatment, is perhaps the easiest and best method. This should be done every two hours. With young children it is necessary to use some force for the first few treatments, but after a little they submit with good grace. At each visit pressure should be made over the mastoid, especially over the antrum and tip, and the patient questioned, to discover if there be pain in this region. A small quantity of sterile gauze should be packed loosely in the outer part of the canal and changed as frequently as it becomes soaked with pus. When mastoid involvement occurs during the course of middle ear suppuration, one's judgment is usually subjected to a severe test. The very early symptoms may be, and sometimes are, relieved by measures other than external operation. Free incision of the drum membrane as heretofore indicated may be sufficient. In fact, the whole theory of such relief is based upon the importance of free drainage. This, together with local blood-letting by means of real or artificial leeches and the application of either the ice coil, or as some prefer, hot poultices, and the hot douche about exhausts the list of abortive measures. The ice coil should not be used longer than 24 or 36 hours, after which time it may become a dangerous application on account of its proneness to mask the symptoms. Continued use of poultices is equally bad. In fact, any prolonged attempts to abort mastoid suppuration are to be deprecated. The patient, of course, should be confined to bed and should remain there until all mastoid symptoms have passed away.

Conclusions: (1) In acute middle-ear suppuration early and free drainage is of the utmost importance; (2) patients should remain in bed until acute symptoms have passed; (3) free purgation (preferably by means of calomel) should be resorted to; (4) microscopic examinations of pus should be made; (5) local treatment should consist of cleanliness and free drainage; (6) proper internal medication should not be ignored; (7) prolonged attempts to abort supporation of the mastoid cells are to be condemned; (8) early operative interference in mastoid suppuration prevents the more serious complications and gives far better hearing results; (9) uncomplicated cases of acute suppuration of the middle-ear, when properly treated, always recover in from two days to three weeks; (10) the responsibility for preventive treatment must be largely assumed by the family practitioner. He should fully appreciate the importance of preventive treatment when caring for grippe, the exanthemata, or other infectious intra-nasal conditions, and also, the early and complete removal of diseased adenoid tissue.

M. Sugar[1] attempts *to prevent ear complication from measles* by instilling a few drops of a 5 per cent solution of silver nitrate into the nose as the child lies on his back. Less than 7 per cent of the cases so treated developed otitis, while more than 16 per cent of the cases not so treated developed ear trouble.

D. Roy[2] gives the *indications for incising the drum membrane* as originally laid down by Politzer:

1. In abnormal thickening and hardening of the drum.
2. In immobilization of the malleus and incus on account of adhesive bands in the tympanic cavity.
3. Where there is a marked impermeable stricture of the Eustachian tube.
4. When there are very intense and lasting noises in the ears which have not been relieved by previous ordinary treatment.
5. As preliminary to intratympanic operations.

Roy thinks as otologists we should try to eradicate from the minds of the laity the prevailing idea that hearing is destroyed if the drum is punctured.

On the other hand, he believes that such a puncture as a therapeutic measure is of much more value than is usually considered.

Hemorrhage. S. Oppenheimer[3] reports a case of *hemorrhage into the tympanic cavity with intact drum membrane.* The patient, a man of 52, had fallen, striking the back of his head upon the floor. After a little time he noticed a sound as of escaping steam in his left ear. He then noticed that he could not hear well.

Examination of the left membrana tympani disclosed a marked degree of retraction, the umbo forming the center of the cone-shaped indrawing of the drum. The membrane itself was otherwise normal and showed no evidence of pre-existing chronic disease, but most striking was the peculiar color; a deep bluish-black of the tympanic contents as seen through the drum. This involved the entire area posterior to the drum head and extended upwards to a line represented by the lower border of the flaccid membrane. The tuning fork, watch and voice were

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(1) Klinisch-Therapeut. Woch.
(2) Laryngoscope, August, 1903.
(3) Laryngoscope, August, 1903.

heard normally by the right ear, but on the left there was absolute deafness as regards air conduction; with the tuning fork over the mastoid, bone conduction was normal while, when placed on the vertex, the sound was heard, best in the affected ear. With the history of the case, the appearance of the membrana tympani and the results of the functional tests showing an obstructive lesion of the sound conducting apparatus, the diagnosis seemed to be clearly an effusion of blood into the tympanic cavity from a rupture of a small atheromatous vessel, resulting from the fall which he had sustained.

He was placed on iodid of potash and given daily pneumo-massage of the membrana tympani, and at the end of a week of this treatment a silver catheter was placed well up in the patulous Eustachian tube and a few drops of sterile, warm water were injected through it into the middle ear cavity. Under gentle aspiration, a portion of the fluid was removed in the same way and decided relief was obtained, while at the same time the original diagnosis was confirmed by the removed fluid containing small coagula from the hemorrhage in the cavum tympani. This procedure was repeated twice weekly in addition to the other treatment and at the end of two months the tinnitus had entirely disappeared, while the hearing showed eight feet for moderate voice and 30-45 for the watch.

The hemorrhage in this case was undoubtedly due to the rupture of a small artery. No inflammation of the middle-ear followed the injury.

Polypus. Dunbar Roy[1] reports a case of *polypus in the tympanic cavity* without perforation of the membrane. The patient complained of severe pain for several days but inspection revealed no redness or other evidence of inflammation. After incision a small quantity of blood and glairy mucous escaped. The next day when suction was made by Siegle's otoscope there appeared at the incision a small red body like a polypus. This was seized with a pair of forceps and removed, it proving to be a mucous polypus about the size of a pea. From this time on the patient rapidly improved and in a few days the discharge ceased, the incision in the drum healed, all pain

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(1) Laryngoscope, August, 1903.

disappeared and the hearing power was equal to that in the other ear.

Chronic Nonsuppurative Otitis Media. D. Grant *divides chronic nonsuppurative ear diseases into two classes*: sclerotic, and hyperplastic; the former is essentially an arthritis of the stapedio-vestibular articulation, the latter mainly a chronic inflammation of the mucous membrane of the tympanum and Eustachian tube. Both present the functional disturbances characteristic of an "obstructive" deafness as revealed by the tuning-fork and other acoustic tests.

In the "sclerotic" form, pure and simple, there is no narrowing of the Eustachian tube, no recognizable indrawing of the tympanic membrane, nor any other visible abnormality except, in the active stage, a rosy-red crescentic area visible through the membrane, indicating a congested condition of the promontory. Politzer, who for the sake of general mutual comprehension applies to it the term "otosclerosis", considers it best described as an osteitis of the labyrinthine capsule. Bezold considers it synonymous with "ankylosis of the stapes", but the drawings made from his microscopic preparations show a very considerable hyperplasia of the periosteum and bone of the tympano-labyrinthine partition. Siebenmann describes the change as mainly "spongiosirung", or what we should term a rarefying osteitis.

The identifying features of this disease are not as clear in the minds of many who discuss the subject as they ought to be. One frequently reads reports of cases of "sclerosis" of the membrane which indicate that, whatever the disease might have been, it was certainly not typical otosclerosis.

The other great type of chronic nonsuppurative disease of the middle-ear is the exudative or hyperplastic inflammation of the mucous membrane. It is commonly the result of extension of inflammation from the nasopharynx up the Eustachian tube, and generally includes a thickening of the walls of the tube. The interference of the ventilation of the tympanic cavity thus produced prevents the renewal of the contained air with sufficient frequency,

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(1) Journal of Laryngology, May, 1903.

and as this is absorbed a state of rarefaction or of negative pressure—that is to say, less than the general atmospheric pressure—is brought about. This gives rise to an indrawing of the tympanic membrane, with consequent impairment of the mobility of the ossicles, and also to an insuction of the membrane of the fenestra rotunda, which in its turn thus becomes abnormally tense. In addition, increased vascularity of the mucous membrane is induced, and an outpouring of secretion into the cavity occasionally occurs. Inflammatory processes are readily excited and adhesions may form from the agglutination of inflamed surfaces brought mechanically into abnormal proximity to each other, or from the organization of intervening exudations. When such adhesions form round the stapes, this bone may become fixed by a false ankylosis, and what may be called a "pseudo-sclerosis" results. This is less progressive than true sclerosis, and is unlikely to lead to the same high degree of deafness. The non-sclerotic type of chronic non-suppurative disease of the middle-ear is, as a rule, the result of catarrh of the nose and nasopharynx, and hence there is generally a history of "repeated colds", after each of which the hearing gets worse.

Since the sclerotic form is not amenable to treatment it is important to differentiate between the two main types of this affection. Should the disease have developed with a history of getting worse after each of numerous "colds", and with evidence of nasal and nasopharyngeal inflammation, or the presence of adenoids, it is most probably not the pure sclerotic, but the diffuse tubo-tympanic catarrh. This would be confirmed if on inspection of the membrane there was found evident indrawing in general. In some cases patches of the membrane, with ill-defined margins, are seen to be abnormally transparent, thinned, and indrawn, and perhaps adherent to the internal structures, such as the promontory or the head of the stapes. In other cases the membrane is almost entirely atrophied and relaxed, being so loose, thin and transparent that it lies against the ossicles and promontory so closely that these seem completely exposed, till on inflation of the tympanum or suction by Siegle's speculum the membrane is drawn out into a bulging bladder. Occasionally a recent exudation in the tympanum may show itself by a peculiar yellow discoloration, bounded in some cases by a definite horizontal line, which moves as the patient bends his head and the liquid gravitates. Inflation then produces moist, crackling râles, and, if the membrane is transparent, bubbles are visible in the tympanic cavity.

In the sclerotic form the onset is usually most insidious, and noises in the head more or less constantly worry the patient before the hearing is definitely impaired. As a rule, there is no history of distinct exacerbations after "colds". The patient is most often of the female sex, especially in the young cases. Many have anemia and show a tendency to clammy coldness of the hands and feet, such as is observed in the early stages of chronic osteoarthritis deformans. In some there is actually a grating of one or the other of the large joints and often of the temporomaxillary articulation. There are neither more nor less than cases of osteo-arthritis with localization in the stapedio-vestibular joint. In many cases sclerosis of the middle-ear starts as the result of pregnancy and gets worse after each confinement. This history, in any given case, would suggest that the chronic ear disease is sclerotic in nature. In other cases, syphilis or gout may form the foundation of the trouble. Politzer considers Gradenigo's opinion that it is often a result of an otherwise latent hereditary specific dyscrasia well founded.

Physical examination shows no abnormality in the membrane such as need interfere with hearing. Slight opacities or calcareous patches are in themselves of no diagnostic importance. The conditions of significance are indrawing and relaxation, and in sclerosis pure and simple, these are absent. One appearance is of weight—namely, the congestion of the inflamed inner wall, in the form of a shining flamingo-red crescent, behind the handle of the malleus. Auscultation during inflation indicates no narrowing of the Eustachian tube, and as the deafness is not the result of non-ventilation of the tympanum, no improvement in the hearing power is produced.

The diagnosis of the mixed cases—those in which, along with essential impaired mobility of the stapes, there is diffuse catarrh of the tympanic and tubal mucous membrane—is difficult to make at the outset. The history may be one of progressive diminution of hearing-power and an increase in the tinnitus. On the other hand, the "sclerosis" may proceed, and we may have tinnitus, with very gradually developing dullness of hearing, getting worse after each of various "colds".

The functional tests in such cases indicate a very high degree of obstructive deafness, inasmuch as hearing for low-pitched tones, and negative Rinne throughout a considerable range of the scale, are well marked. A narrowing of the Eustachian tubes is generally recognizable, but improvement on inflation is extremely small or absent altogether. The tympanic membrane presents the appearances characteristic of tubo-tympanic catarrh—namely, indrawing, synechiæ, and partial or general relaxation.

A. Schloss[1] finds *hot air of great value* in the treatment of non-suppurating ear disease, especially for the relief of distressing tinnitus aurium. He uses a Hopkins electric heater and allows the air to reach a temperature varying from 200° to 400° F., depending on the case. This hot air is used at a pressure of 5 pounds or 6 pounds for as long a time as the patient can stand it, not exceeding 5 minutes. The diameter of the opening of the ear pieces is 3-16 inch, so the volume of air used is considerable. The method of using or applying it is very easy: First, thoroughly cleanse the external auditory canal, then dry with a little alcohol. When the air is about the right temperature, place the ear piece in the external auditory meatus and direct the stream of air as near as possible against the tympanum.

The cases are treated three times a week, usually for about 8 weeks.

George Stoker[2] advocates the use of *ozone in the treatment of catarrhal deafness.* In describing the malady he says it is generally believed to be due to stenosis of the Eustachian tube. This latter condition may arise from interference with nasal respiration due to congenital malformation or to hypertrophy of the mucous membrane of the nose or nasopharynx. The symptoms are progressive deafness, with tinnitus of various kinds and varying intensity. The tympanic membrane is retracted and usually opaque.

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(1) American Med., Sept. 12, 1903.
(2) Lancet, Nov. 1, 1903.

There are no signs or symptoms of the auditory nerve being involved. Of all forms of deafness this is the most common and the most intractable, and it is no exaggeration to describe it as the opprobrium of otology. The stenosis of the Eustachian tube affects the mucous membrane lining the middle-ear (1) by preventing the free ingress and egress of air; and (2) by confining the secretions that exude from the lining of the cavity and thus setting up unhealthy conditions. These conditions lead to thickening of the mucous membrane and consequent deafness. The nasal stenosis may be relieved and the Eustachian tube become more open but the deafness still increases; this points to a remaining unhealthy condition of the middle-ear. The effect of oxygen and more particularly of its allotropic form, ozone, in restoring a healthy condition to diseased nasal mucus membrane led to a trial of the latter in chronic progressive deafness. The ozone was generated by means of an electric current acting on a Ruhmkorff coil to which the ozonising tube was attached. The ozone so generated was pumped into the middle-ear through a Eustachian catheter for about three minutes from twice to four times a week, according to opportunity. The following are notes of cases treated, the conditions first described being those existing before the ozone was applied:

Case 1—The patient, a woman, was first seen on Feb. 4, 1902. She had been growing deaf for six years. She had marked and very distressing tinnitus. Both tympanic membranes were depressed and opaque. Mastoid bone conduction was good. Aerial conduction was minus on both sides. A watch could be heard one inch from the right ear and two inches from the left. On March 24, after the twelfth application of ozone, the tinnitus had disappeared. A watch could be heard three inches from the right ear and four from the left.

Case 2—The patient, a man, was first seen on Feb. 4, 1902. He had been deaf for several years. He had had constant tinnitus. Both tympanic membranes were depressed and opaque. Mastoid bone conduction was good. Aerial conduction was minus in both ears. A watch, on contact with either the right or the left ear, could not be heard. On March 4, after the tenth application of the ozone, the tinnitus had disappeared. On April 18 there had been no recurrence of tinnitus. A watch could be heard on contact with the right and left ear.

Case 3—The patient, a man, was first seen on Feb. 4, 1902. He had been deaf over one year. He had mild intermittent tinnitus. Both tympanic membranes were depressed and opaque. Mastoid bone conduction was normal. Aerial conduction was minus on both sides. A watch could be heard on contact with the right ear and half an inch from the left ear. On March 12, after applications of the ozone, the tinnitus had disappeared. On April 18 there had been no recurrence of tinnitus. A watch could be heard eight inches from the right ear and nine inches from the left ear.

Case 4—The patient, a woman, was first seen on Feb. 4, 1902. She had been deaf for seven years. There was constant tinnitus. Mastoid bone conduction was good. Aerial conduction was minus on both sides. A watch could be heard two inches from both ears. On March 4, after the sixth application, the tinnitus had ceased. On April 18 there had been no recurrence of the tinnitus. A watch could be heard two and a half inches from the right ear and three inches from the left ear.

In all the above cases it will be seen that the hearing has considerably improved; in some the progress made has been remarkable. This improvement as shown by the watch represents a much greater improvement when the voice is in question. The disappearance of the tinnitus after a few applications is very important. It is reasonable to suppose that if the ozone could have been used every day the results would have been better still.

[From observations made with the use of ozone generated by the static machine the Editor is inclined to the belief that in connection with other plans of treatment it is of decided value.]

S. F. Snow[1] believes that while looking after the local conditions the *general health and hygiene* should not be forgotten.

The common habit of warm bathing, coddling and living in super-heated rooms is most pernicious and sure to be followed by membranes that are thick and loaded. With

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(1) Buffalo Med. Jour., Jan., 1903.

our modern environment it seems absolutely necessary to do something to counteract these tendencies, hence the observance of personal hygiene becomes one of paramount importance. As a rule cold baths should be taken, but when impracticable, which is seldom, a brisk dry rubbing with a harsh towel not only starts a good reaction, but exercises the skin, an important step in promoting elimination, tone and vigor.

Either or both of these measures can be depended upon to so toughen the surface that it ceases to act as a menace to the deeper membranes and organs. Head colds are not as common and nature has a chance to produce absorption of inflammatory products.

Protection of the body should become less and less a problem of importance as the patient acquires a prompt skin reaction, but protection for a time has to be considered, and at all times so far as relates to footwear, the feet always needing to be kept warm and dry.. Wool or linen mesh are the best materials for undergarments, but they should be of light weight and porous, while the outer clothing should be selected to insure comfort and changed according to the weather conditions.

That pathologic states of the liver produce an increase in the thickness of membrane lining the Eustachian tube is too often noticed to be gainsaid. In fact, with some a torpid liver is the most prominent constitutional factor, and may block all our efforts to get local treatments through the middle-ear. A large percentage of these bad chronic cases of deafness can be traced to an over-indulgence in the good things of life; the liver becomes unable to do the extra work required and curbing the appetite is absolutely necessary.

With these obstacles removed local treatment of the nose and ear in most cases will be much more effective, while in some cases we may be able to only hold the conditions stationary.

N. H. Pierce[1] has used the *electric bougie in a number of cases but with little success.*

The electric current was taken from the Edison street circuit of 110 volts and let through a Victor shunt-con-

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(1) Laryngoscope, Jan., 1903.

troller. From fifteen to thirty volts were necessary to obtain from two to five milliamperes with the negative pole attached to the Eustachian bougie, while the positive pole on contact with the sponge electrode was held in the hand opposite to the tube operated on. The wrist-clamp, devised by Wendell C. Phillips for connecting the positive electrode with the wrist, may well be recommended, as annoying variations of the current may be caused by inconstant pressure when the sponge is held in the hand. The gold electric bougies made by Meyrowitz were employed. Contact lasted from three to ten minutes. Length of contact and strength of current varied according to the electrical resistance of the patient and the resistance offered to the passage of the electrode in the tube and the subjective sensations of the patient. Both the plain rubber catheter and the silver catheter were used. The silver catheter, insulated by means of rubber tissue is more easily kept clean and more readily adapted by bending to the peculiar topography of each case than the rubber catheter. The procedure was nearly always carried on under cocain, all active inflammatory processes having been first allayed and the strictest cleanliness observed.

As a result of his experience he offers the following conclusions:

1. In otosclerotic disease, electrolysis is useless.
2. In the great majority of cases of catarrhal disease it has no advantages over other methods of treatment.
3. In a certain few cases where there is probably a soft exudate near the isthmus, it may be regarded as of some value.

[It is the Editor's opinion that some of the failures reported have been caused by cauterization of the Eustachian tube. A series of experiments has proven that five milliamperes of the negative current applied to the nasal mucous membrane over an area no larger than the bulb of a Eustachian electrode will cauterize, and that when the contact is kept up for three or four minutes a decided cicatrix results. A cicatrix in the Eustachian tube with its subsequent contraction must necessarily defeat the very purpose for which the electrode is used.]

J. O. Tansley[1] removed a *broken gold wire electrode from the Eustachian tube.* From the history of the case the wire must have been in the tube about a month. The end of the wire could be seen and felt in the meatus of the tube and was removed by means of a polypus forceps.

[Other instances of breaking the wire in the Eustachian tube are reported, but it is difficult to imagine how such an accident can occur if the electrode is properly made and the operator uses it with any regard for the delicate structures under treatment.—ED.]

R. Barclay[2] is an advocate of *ossiculectomy for the relief of certain forms of deafness.* It has been his experience, so far without a single exception, that any very deaf person, who speaks habitually in an abnormally moderate or low tone of voice, who can hear better in a noise—no matter how many years he may already have been affected, and notwithstanding that every other possible remedial measure may have been tried in vain—may yet be relieved by resection of the auditory conducting mechanism, proportionately to the distinctness of these two symptoms.

[If the above statements are correct it becomes evident that some of the eminent advocates of this plan of treatment have been unwise in their selection of cases, for in many instances their results have been anything but satisfactory.—ED.]

C. P. Linhart[3] thinks the *outlook in chronic middle-ear catarrh is not very encouraging at the best.* Before starting with the routine treatment the primary cause of the difficulty should be removed. Very often there will be found a spur extending out from the septum blocking the way to the free passage of air through the nose, and interfering with the drainage, accompanying this deformity is sometimes found a deflection of the septum. The spur, if sufficient to cause trouble, should be removed and the deflection corrected. When there is hypertrophy of the turbinals they should be reduced by surgical or medical treatment.

In examining the nose and ears it is frequently noticed that there is a congestion of the drum membrane corresponding to the side of the nose that is occluded, even when

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(1) Laryngoscope, Jan., 1903.
(2) St. Louis Med. Review, Feb. 28, 1903.
(3) American Medicine, Aug. 29, 1893.

the occlusion is only temporary from a congested turbinal. At times when the nose is occluded on one side the opposite ear will be found affected. In the latter case it would seem that the current of air passing freely through the unaffected side makes a whirlpool of air in the vault of the pharynx which cools and dries off one part and causes a congestion in another, eventually leading to a chronic thickening of the mucous membrane and underlying tissue. When the way is made clear through the nose the mucous membrane covering the turbinals should be cleaned with some spray or douche every day until the secretion of the mucous glands becomes normal.

Usually one ear becomes affected first, then after a time the other begins, and the progress of the disease in the second ear is much more rapid than in the first. This is presumably on account of the nerve disturbance. This disturbance of the auditory nerve facilitates the progress of the disease in the second ear. Often the patient does not know of his progressing deafness until the second ear becomes affected, and he complains of deafness on this side when, on examination, the other ear will be found in a worse condition. When one ear is so deaf that it is of no practical use, it should be treated the same as the other, for it may improve more than the other.

The progress in these cases is usually slow. Patients will need encouragement; tests with mechanical instruments ought to be made once a month, and the improvement noted, so that the patient can see by the examination that he is making a gain, or at least is not losing anything. His friends, who expect a great deal of a physician in a short time, will tell him that he is not hearing any better, and he will require constant watching and encouragement. It is well known that we who hear well hear much better than we need to for ordinary conversation and that our hearing varies much from day to day; but hearing so well we do not notice this daily variation. These unfortunates are susceptible to every atmospheric change. When the air is damp and heavy the mucous membrane of the nose, Eustachian tubes, and ears become thickened; it is then that their hearing is duller than usual, for at best they must give close attention to hear ordinary conversation. Then it is fair to presume that people do not talk with the same degree of loudness every day of their lives, so that if the speaker happens to be feeling indisposed his voice weakens and the unfortunate listener is blamed for not hearing so well when it is not his fault at all.

When the Eustachian tube is patulous and there is much thickening of the drum membrane, external massage by means of the Delstanche masseur may be used with benefit.

By sticking to these patients and encouraging them, it is surprising how much benefit can be got out of some such routine work as described above. Even when the hearing cannot be materially improved, if the progress of the disease can be stopped, a great deal of good will have been accomplished.

It is well known that in deafness due to chronic middle-ear catarrh there comes a time with some people when without any treatment on the part of the physician the progress of the disease ceases. At times there is even an improvement in hearing. If this occurs without any special treatment on the part of the physician, surely it is reasonable to presume that the medication and treatment of this disease will stop its progress and hasten the period of improvement.

While recognizing the fact that there are many indications to be met in the treatment of chronic non-suppurative middle-ear disease, G. W. Hopkins[1] thinks the judicious use of *hot air in the auditory canal* will accomplish more than any other single procedure.

A temperature varying from 250 degrees to 400 degrees F. is applied and is easily borne if the maximum temperature is slowly approached. Moist heat could never be applied at such high temperature or to as much advantage. It is unfortunately true that some of the compressed air heaters now on the market are mere toys and fail utterly to yield a curative temperature, or yield it, perhaps, at an improper rate of elevation so that a curative temperature cannot be tolerated by the patient. The writer employs an electric compressed air heater which acquires its maximum temperature from a given air pressure in ten minutes and finds the rate of elevation just about right.

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(1) Med. News, Aug. 22, 1903.

If the temperature is then well borne it is raised still higher at the ear tip by gradually increasing the air pressure. Ordinarily the treatment lasts about fifteen minutes or until the limit of toleration is reached. No fixed temperature can be employed in all cases, the operator being governed entirely by the individual toleration of the patient under treatment, the toleration not only varying widely in different patients, but in opposite ears of the same patients, even under precisely similar conditions.

It is necessary that the ear under treatment shall be clean and packed with dry gauze (two thicknesses) to prevent scalding from the boiling of any moisture present, and when it is done there is absolutely no danger of burning.

It is only by taking this precaution that high temperature can be employed, without burning. The benefit derived from applications of dry heat is directly proportional to the degree of heat applied, and high temperatures can neither be tolerated nor safely applied in the presence of any accumulated moisture. It has been pretty well demonstrated that intense heat stimulates the circulation through the blood supply on the posterior side of the manubrium, causing absorption of the articular deposits; re--moving atrophy and relieving rigidity of the tensor tympani. The ossicles lie so near the surface that they receive the full benefit of heat applied to the tympanum and adhesion between portions of the ossicular chain and the adjoining bony walls of the middle ear are readily removed.

Naturally, much better results are secured in the same period of time in hypertrophic cases than in those characterized by hyperplasia; but many cases of the latter type, which would ordinarily have been regarded as hopeless, have gradually acquired marked improvement under this treatment. Occasionally slight vertigo or headache results from treatment, but is very transient in character and requires no treatment. Vertigo may become serious if heat be applied to both ears on the same day and it is, therefore, unwise to make such applications. The writer regards as *contra-indications* to this treatment arteriosclerosis, serous effusions into the tympanum and perforations of the membrane. As an exclusive treatment it is rarely of much value in serious cases. When carefully employed it is absolutely safe unless contra-indicated. It is of little value in old subjects who have extensive labyrinthine involvement. Superheated air (especially when compressed) acts more favorably upon the ossicular chain than upon many other articulations because of the exceptional proximity of the entire bony structure to the surface.

Treatments are best given three times a week for from three to twelve months. The writer sometimes gives daily treatments for the first month, but if any additional dullness of hearing is observed as a result of treatment the intervals are immediately lengthened. A good routine practice consists of inflating the Eustachian tube and middle-ear with a warm vapor from a good nebulizer at the conclusion of every superheated air treatment. When indicated and judiciously employed, in conjunction with such other measures as may be indicated this method will give results which would be utterly unattainable without its aid.

Obstinate cases of this disease usually call for a combination of agencies, each of which has its own indications, but good judgment is often necessary to avoid meddlesome therapeutics.

Every case must be treated as a whole; every indication must be met. All abnormal conditions of the nasopharynx must be properly treated. The Eustachian tube and middle-ear must be carefully attended to. Antiseptic washes must be used often enough to maintain a clean mucous membrane; different cases frequently requiring very different washes.

G. W. Hopkins[1] lays down the following rules regarding the use of the gold wire bougie:

(a) Neither heavy nor uncertain currents should ever be employed; (b) perfect current control (preferably by a shunt circuit rheostat) is absolutely imperative; (c) the current employed should not be of less electromotive force than 30 nor more than 35 volts; (d) the current strength should never exceed 1½ milliamperes at the beginning or 5 milliamperes at the end of a treatment, and the latter

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(1) Med. News, Aug. 22, 1903.

amperage should be very slowly approached. Many cases require no more than four milliamperes; (e) treatment should never be given less than three days apart; (f) force should never be employed; (g) reliance should be placed upon a number of light treatments rather than upon a few heavy ones; (h) polarity of current should never be in doubt.

These points, carefully observed, remove every element of danger from the operation and leave the opponents of the operation without any ground upon which to base their opposition. Skilled operators have obtained brilliant results in a large number of these cases, and such operators will continue to get such results regardless of any criticism which may come from those who are less skilled in applying this particular form of treatment.

If the treatment be employed with reasonable skill and with due observance of the precautions mentioned the several causes of failure will be eliminated. There cannot be much pain if the voltage and current strength are properly controlled and all necessary changes of current strength slowly and carefully made. There can be no reformation stricture as a result of treatment unless the current be excessive, of wrong polarity or applied too frequently. There can be no formation of a fistula unless the operator forgets the anatomy of the parts and only then, ordinarily, by the employment of excessive current or undue force. Properly employed, this treatment causes the stricture to fairly melt away beneath the slowly advancing electrode until the tip of the electrode is felt slipping into the space beyond the stricture. This method is probably the best one ever devised for such cases of catarrhal deafness as are entirely due to occlusion of the Eustachian tube.

A nice modification of this treatment consists of using a cataphoric electrode at the anode or indifferent pole, saturating it with a suitable iodin or ichthyol solution (iodin vasogen or ichthyol vasogen being sometimes preferred), and holding it against the membrana tympani during each electrolytic operation. [The Editor would suggest that in all applications of electricity to the drum membrane, the patient's feelings should be the meter. One milliampere applied directly to the membrane is usually painful.]

Chronic Suppurative Otitis Media. The literature of the year indicates that there is still much uncertainty in the minds of writers upon the therapeutic capabilities of different drugs as well as uncertainty regarding the pathologic conditions to be corrected before there can possibly be a cessation of the discharge. Much of this uncertainty no doubt lies in the fact that it is impossible always to know after examining a suppurating ear just what the extent of the pathology in the attic, antrum or mastoid may be. After performing the tympanomastoid operation upon a considerable number of cases which had not responded to the ordinary methods of treatment, the Editor believes that the prognosis in any given case depends much more upon the character and extent of the lesion than upon what drug is used or what plan of treatment is adopted. Cases have been found which showed no marked symptom other than intractable discharge, but when the mastoid was opened diseased bone was found extending almost or quite to the tip. When such conditions exist those who expect a cure to result from the use of medicinal remedies, no matter how applied, are doomed to disappointment. Among the newer remedies is found the *anilin solution of iodoform* as recommended by A. A. Gray[1]

The solution is of a pale brown color and on evaporation (which is slow) the iodoform is deposited in large crystals. It keeps for a considerable time—a month or two—if stored in a glass-stoppered bottle and if impurities are carefully excluded. Ultimately it turns a beautiful crimson color due to the formation of an anilin dye and associated possibily with the gradual liberation of iodin. It is useless for surgical purposes when this red color has developed.

The method employed in a given case is as follows:

The ear is first syringed out and dried, the drying being done very carefully with pledgets of cotton-wool wrapped round a probe and used under the guidance of a speculum and forehead mirror in the usual way. Five minims of the saturated solution are then measured out, soaked up on a small piece of cotton-wool, and applied with forceps to the secreting surface or pressed gently into the perforation. The cotton-wool is left in for five minutes and is then re-

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(1) Lancet, April 18, 1903.

moved; the excess of the solution lying on the walls of the meatus may be removed by small cotton-wool swabs, but that lying in the tympanum or on the membrane should not be removed. The procedure is repeated twice or at most three times in the week and instillations of rectified spirit may be used on the intervening days.

There are certain limitations to the use of the anilin solutions. The first of these is the limitation in regard to the dosage. Anilin, being toxic and possessed of remarkable penetrating power, must be used in such a way that not more than a certain amount can be absorbed. From an experience of several hundred applications on the skin, on mucous membrane, and hypodermically, the author has determined accurately that anything under four minims may be absorbed without producing any symptoms of poisoning in an adult. Above this amount cyanosis may occur, particularly in anemic patients. Fortunately more than four or five minims are never required in ear work, so that if the surgeon measures the dose he can use the preparation with absolute confidence.

The second objection is more likely to be experienced in practice. The skin of some individuals responds to the application in a peculiar way. Thus, in the writer's own case, if a few drops be rubbed on the back of the hand for a minute or so the part remains unaffected for a few hours, then an erythematous blush appears, accompanied by slight swelling and itchiness. This condition lasts for a day or two and gradually passes off without desquamation. Now, it can readily be understood that if the application be too frequently repeated the erythema described might develop into an eczematous condition. It is therefore on the whole advisable that the surgeon should make the applications himself and limit the number of these to two, and in susceptible cases to one per week.

To sum up: (1) the solution should be measured before use; (2) the drying out should be done with the same care as is required in the other methods of treatment; (3) granulations should be removed, though this is not quite so imperative as it is in other methods of treatment; (4) the applications should be made by the surgeon himself, and (5) the use of the solution is indicated in practically all those cases which do not do well when treated in the usual ways—that is in foul-smelling and presumably tuberculous cases.

In suppurative ear diseases J. Beck[1] uses a *combination of hot air and the vapor of formalin.* He has devised an electric heater which consists of a cylinder mounted on a handle. The tip of this metal cylinder is mounted by a wood fiber canula, two inches in length, which is detachable. Within the cylinder is an incandescent lamp, which carries a current of 115 volts, supplied with a switch at the handle to turn off or on the current by simple compression. At the back of the cylinder is an opening into which is inserted the nozzle of the compressed air tube. The medicator is within the cylinder; it is a small metal box, containing a piece of felt, which is saturated with the desired medicament, and it acts at the same time as a filter for the air.

As soon as the electric current is turned on the metal cylinder begins to get hot, and within a minute or two it has acquired a sufficient heat to warm the air which passes through it from the air tubule. As soon as the current of air is allowed to pass through this heated chamber, it will come out in a concentrated warm stream from the tip of the wood fiber canula. It requires about two minutes to produce a very hot current, but the temperature can be regulated by the switch. The pressure of the air can also be regulated by the cut-off on the air tubes.

In the application of this method the heated medicated air has a three-fold use:

1. It stimulates suppuration and helps to throw off pathologic processes, thereby producing a healthy surface of healing. It produces epidermization more rapidly.

2. The cavity is dried, and produces a poor culture nidus for bacterial development.

3. The formalin in this gaseous state is forced into all crevices, and exerts its germicidal action more efficiently.

[The Editor has used the hot air and formalin vapor in a number of cases with satisfactory results. The greatest objection to its use is the pain caused by the formalin.]

In a very large per cent of the chronic suppurative cases coming under his observation, E. B. Dench[2] *finds the ossi-*

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(1) Laryngoscope, May, 1903.

(2) Am. Jour. Med. Sciences, Nov., 1903.

cles necrotic. While he was formerly in the habit of removing the ossicles for the relief of chronic suppuration, he has later come to the conclusion that it is better to do a more radical operation, reserving ossiculectomy for those cases where there is evidence that no caries exists beyond the ossicles. When the ossicles are removed it is important though sometimes difficult to find and remove the incus. In addition to removal of the ossicles it is a good plan to remove the thin plate of bone which forms the outer wall of the attic and the inner end of the auditory canal. This can best be accomplished by the use of a small pair of angular rongeur forceps, cutting antero-posteriorly, which are introduced through the speculum into the canal and made to bite away as much of the inner extremity of the superior bony wall as can be engaged between the blades. It is often wise to institute this procedure immediately after the removal of the malleus in those cases where a moderate search fails to reveal any trace of the incus. Not infrequently, after the removal of the floor of the tympanic vault in this way, a remaining fragment of the incus may be easily seen and extracted.

J. E. Brown[1] finds a considerable number of cases in which if the *malleus, incus and remains of the drum-membrane are removed* the suppurative process is brought to a successful termination. These are cases in which there is imperfect drainage from the attic and possibly the antrum, in which granulations or small polypi may be found, and do not yield to ordinary treatment; in which if caries or necrosis is present, it is either limited to the ossicles, tegmen tympani or to the inner end of the roof of the meatus.

In children, timid adults, and in cases where the tissues are vascular and thickened this operation requires the use of a general anesthetic. It can be made more frequently under local anesthesia than one would be inclined to believe possible from what is said in text-books. When one considers the apprehension with which many patients look upon the taking of an anesthetic, and when we, as surgeons, consider the risks involved, one is perfectly justified in attempting this operation under local anesthesia with favor-

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(1) **Columbus Med. Jour., Sept., 1902.**

able conditions. The position of the patient and the more satisfactory conditions under which reflected light is used give a number of advantages to the operation without general anesthesia. If the latter is used, a good electric head-lamp is practically indispensable. By means of adrenalin or solution of suprarenal extract, hemorrhage can be made much less and the work done with much more rapidity than without the aid of this drug. The operation requires the severing of the attachment of the drum membrane to the upper wall, and of the suspensory ligaments of the ossicles. With a blunt knife any remaining portion of the drum membrane below may be severed from its attachment at the periphery, and then the malleus is grasped with forceps and pulled downward so that its head can be extricated from the attic and the whole removed with portions of the drum membrane attached to it. With the proper angular knife the incudo-stapedial articulation is severed, if still existent. Where this is necessary usually the long arm of the incus is in view and it can be grasped by proper instruments and the ossicle removed. However, in a great number of cases where this operation is resorted to, but little remains of the incus and its articulation with the stapes may be already severed. A diligent search, however, should be made in the attic, first with the ordinary incus hook of the middle ear operating set, and later with the curette. In this operation care should be taken not to curette the inner wall of the tympanic and epitympanic cavities, for often dehiscences of bone have occurred, exposing the facial nerve, which could easily be wounded were curettement attempted. However, it is very essential to curette the roof of this space and its outer wall which faces toward the meatus. This is done with curettes specially made for this work.

Ossiculectomy under local anesthesia is attended with considerable pain, but it is as well borne as a number of intranasal operations in which we would not think of using a general anesthetic. The patient is not placed *hors de combat* at all, and the next day is able to follow his everyday duties as usual. Where an anesthetic is necessary convalescence is practically limited to recovery from the anesthesia. The patient needs to remain in the hospital but twenty-four or forty-eight hours after the operation. The after-treatment in these cases is simple, and it is surprising that the operation is not more comonly practiced. As stated above, in a selected class of cases it often effects a cure. Where the radical operation has been advised but declined, ossiculectomy may be accepted inasmuch as it is a simpler procedure and the patient is not prevented from following his usual duties, as would be the case for several weeks were the radical operation performed.

[In all middle ear operation whether under local or general anesthetic suprarenal extract or adrenalin will be found of great value because of its property of preventing hemorrhage. When used with or immediately following cocain it greatly increases the anesthetic property of the cocain.—Ed.]

In opening into the attic for chronic suppuration, Strum[1] recommends the rotary burr. The outer wall of the attic can be quickly and easily removed and even the whole of the antrum exposed. Anatomic conditions, however, must be favorable, *i. e.,* there must be a short wide auditory canal allowing the use of a burr with a short shank. The burrs used in Koerner's clinic vary from pyroform to a spherical shape and have a diameter of two to three millimetres. Their blades have a slightly spiral course and diminish in size as they approach the pole where they terminate. They have a much slower action at the pole than at the equator. This enables the operator to proceed more cautiously when using the pole, as in the removal of superficial necroses, and to work faster in entering the attic, where the coarser part of the burr comes into play when working laterally.

General anesthesia can usually be dispensed with when the burr is used for the removal of necrotic areas from the labyrinth walls. However, when the attic is to be opened, general anesthesia is advisable. In this operation the burr readily penetrates the thin skin of the ear canal, making section of this tissue unnecessary. Bleeding is usually not severe, yet it takes frequent mopping to enable the operator to see distinctly. For this purpose gauze saturated in a solution of ferripyrin and cocain is used. The field of operation should be well illuminated by electric or reflected light.

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(1) **Archives of Otology, Dec., 1902.**

At the completion of the operation the cavity is irrigated, a tampon of gauze inserted, and a bandage applied. The only ill effect of the operation so far observed has been tinnitus, which usually subsides after several days.

In an operation made by Koerner when the outer wall of the attic was removed, a remnant of the body of the malleus and part of the incus were beautifully exposed and easily removed with forceps. As the attic contained no granulation tissue, and showed no break in the epithelial lining, it was evident that the pus had its origin in the antrum. Consequently it was decided also to enter the antrum with the burr. Two longitudinal sections were made through the soft parts of the ear canal, including the periosteum, one extending the length of the upper wall almost to the concha, the other along the inferior wall posteriorly. This tongue-shaped flap was elevated from the bone and pulled out of the canal and held there by means of artery forceps. Working with the burr through a short wide speculum, entrance was gained into the antrum by removing its anterior and external walls. The antrum was so thoroughly exposed that its most remote crevices could be seen. The cavity was lined with epithelium, but contained three or four small granulating areas on the posterior and median walls. After these were thoroughly removed with curette, the flap of the membranous canal was replaced and held by a tampon. Forty days afterward pus formation had entirely ceased. The function of the ear had been so much improved that a whisper could be heard at seventeen metres, Four months later a small granulating area again appeared, but after its removal there was no further trouble.

Tuberculosis. J. L. Goldstein[1] reports four cases of *primary tuberculosis of the ear followed by mastoiditis.* The microscope showed unmistakable evidence of tuberculosis. From their definite clinical and pathologic data he feels justified in his conclusions as to primary character of tuberculous infection of the ear. All of these cases were seen more than three years ago; three of the four are still living, and careful physical examination fails to show any present tubercular affection. There are no evidences in the histories of these cases or in their clinical development,

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(1) Medical News, March 14, 1903.

either of acquired or hereditary tuberculosis in the families of these patients. Of the four cases, three involved the mastoid cells extensively, and showed an unusually active and rapid invasion. All of the cases developed from a preexisting otitis media suppurativa chronica, and appeared to be a direct infection by the bacillus tuberculosis. In the three cases where the mastoid operation was performed, the wounds healed by firm granulations, and all evidences of tuberculous trouble ceased with the removal of the local process. This is in direct contrast to the healing of wounds in patients where the systemic tubercular invasion is present. The data which have been furnished in the cases herein reported all point to definitely localized specific infection of the cavum tympanum and mastoid cells, with the characteristic development of a tuberculous process as it occurs in bone tissue, and with the definite demonstration of the bacillus tuberculosis in each case.

R. Levy[1] has made a study of *middle-ear disease in tuberculous patients as seen in Colorado.* He summarizes as follows:

1. Any of the usual aural affections may affect the tuberculous as well as the non-tuberculous.
2. The usual modification of an acute otitis in a tubercular subject is manifested in the course the disease pursues.
3. It is a doubtful question whether the bacillus tuberculosis is present as a distinctly etiologic factor or as an accident.
4. Comparatively few cases of tuberculosis in children and relatively few instances of bone tuberculosis are met with in Colorado.
5. Clinical tuberculous otitis occurs with moderate frequency in Colorado, being secondary to lesions of the respiratory organs.
6. Tuberculous otitis may develop when the general symptoms of tuberculosis have been arrested and the patient's condition is unusually good.
7. Tubercle bacilli may find their way into the middle-ear through the Eustachian tube, through the lymph channels or the blood currents.

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(1) Laryngoscope, May, 1903.

8. Unusual care must be exercised in the application of the nasal douche in tuberculous patients.

9. The discharge may be arrested, but not permanently as a rule.

10. It must be exceedingly rare for miliary tuberculosis to develop from an otitis as the focus of infection.

11. Thorough irrigation with tubercle bacilli destroying agents is of prime importance in the treatment.

12. General and climatic treatment must be conscientiously carried out.

In tuberculous ear disease in tuberculous patients the first object to be attained as in all forms of tuberculosis is to cause an arrest of the disease. After this, functions may be restored in proportion to the amount of destruction that has taken place. Locally, cleanliness is of prime importance. Cleanliness and the destruction of the tubercle bacilli may be accomplished by free irrigation with solutions of formalin, in strengths varying from 1-5000 to 1-2000. The large perforations and the usual patency of the Eustachian tube enable one to freely irrigate the tympanic cavity. If the tube is not entirely open, catheterization should be practiced. If granulations fill the tympanum they should be destroyed with a chemical caustic and completely shrunken by formalin or alcohol. If inflation and freeing the middle-ear of granulations do not allow of through and through irrigation and thorough cleansing, the aural pump should be used and suction applied.

Of course all carious or necrosed tissue, whether soft parts or bone, must be removed, such means being employed as are necessary, from the mildest to the most heroic. Finally the greatest attention should be paid to general treatment. The cardinal principles in the treatment of tuberculosis are a maximum of pure, fresh air, a maximum of sunshine, a maximum of rest, a maximum of most nourishing food.

According to W. Milligan[1], *tuberculous disease of the middle-ear and its accessory cavities may be primary or secondary.* It is his opinion that the primary form, especially

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(1) Jour. Laryngology, Rhinology and Otology, March, 1903.

in young children, is much more common than is generally supposed.

Secondary tuberculosis of the middle-ear occurs more frequently as a complication of tuberculosis of the respiratory tract, than as a complication of similar disease affecting bones, glands, or abdominal viscera.

In a series of cases reported some years ago, this author found 16 per cent of nasopharyngeal adenoid growths of a tuberculous character.

The main predisposing causes are infection from association with tuberculous individuals, hereditary tendency to the catarrhal diathesis, improper and insufficient alimentation, unhealthy environment, the existence of any form of wasting disease, *e. g.*, scarlet fever, diphtheria, scarlatinal diphtheria, etc.

Tuberculosis of the middle ear whether primary or secondary may run an acute or chronic course. The symptoms of tuberculous middle-ear disease are grouped under two headings—subjective and objective.

The symptoms of acute tuberculous disease of the middle-ear are somewhat anomalous. The occurrence of a middle-ear inflammation of medium intensity, and accompanied by considerable impairment of hearing in a subject of delicate constitution, might possibly suggest a diagnosis. It is only, however, by the discovery of multiple perforation or great destruction of the membrane, early and rapid formation of granulation tissue, early enlargement of the periotic ganglia, or early facial paralysis, that suspicion as to the true nature of the disease is usually aroused. The fact that such cases rapidly assume a mixed infective type tends also to mask an accurate diagnosis. In the chronic and more usual form of the disease the main subjective phenomena are the occurrence of a middle-ear inflammatory process with a variable degree of impairment of hearing, with a varying amount of subjective tinnitus, with a varying sense of fulness in the head and affected ear or ears, and an almost complete absence of pain.

The objective indications of the disease are referable to the effects produced by the deposition of bacilli within the mucosa of the tympanic cavity and to the subsequent ulcerative effects which are thereby induced. In certain rare cases miliary tubercles may be seen through a pale and semi-transparent membrane. Being deposited, as they are, in the first instance, in the superficial layers of the mucosa, they appear as yellowish areas in a pale pearly gray membrane. Owing to the caseating of their central portions, they readily break down and form superficial ulcers. This ulcerative process extends to the deeper portions of the mucosa and subsequently to the underlying bone. When deposited upon the mucosa of the membrana tympani they tend to produce multiple perforations. These perforations, by their coalescence, produce ultimately great destruction of the membrana tympani.

In conclusion he advances the following propositions:

1. That in all cases of middle-ear disease of suspected tuberculous origin, search should be made for tubercle bacilli, either in the discharge, in tufts of exuberant granulation tissue, or in enlarged periotic glands.
2. That inoculation experiments (either subcutaneous or intraperitoneal) afford a ready and reliable means of proving or excluding the tuberculous nature of the disease.
3. That a final and exact diagnosis is imperative both from the point of view of prognosis and of treatment.
4. That tuberculous disease of the middle-ear and accessory cavities is a frequent disease among infants and young children.
5. That the disease is most frequently found as secondary to tuberculous processes in other regions of the body.
6. That primary tuberculous disease of the middle-ear is probably of more frequent occurrence than is usually supposed.
7. That the prognosis is always grave, but that in a certain proportion of cases suitably planned surgical intervention will eradicate the disease.
8. That in many cases it is advisable to conduct the operative treatment "in stages."
9. That when less than 10 per cent of hearing-power remains no attempt should be made to preserve the organ as an organ of special sense.
10. That when more than 10 per cent of hearing-power remains in a patient in otherwise apparent health, a definite attempt should be made to preserve the hearing-power that still exists.

11. That where the tuberculous origin of the disease has been scientifically demonstrated the case should be regarded as infectious and precautions taken accordingly.

In the treatment of chronic suppuration, Geronzi[1] recommends the use of 5 *per cent formalin in glycerin* with the addition of 5 per cent carbonate of sodium. The remedy seemed to have a favorable effect on the fetor and upon the granulations; 55 cases are reported

Wyatt Wingrave[2] reports the microscopic examination of the discharge in one hundred cases of middle-ear suppuration with an analysis of results, having special reference to the *presence of tubercle and acid-fast bacilli.* Investigation was undertaken not with a view of making an exhaustive bacteriologic search, but chiefly for the purpose of testing the value and reliability of microscopic examinations for acid-fast bacilli available under ordinary circumstances. The discharge was always taken from the deepest available part and as near as possible to the diseased area.

The discharge was removed with a small curette, squeezed between sterilized cover-glasses and fixed by heat. After boiling in carbol-fuchsin for three minutes the smear was placed in 25 per cent sulphuric acid until all color had disappeared; but if on washing with water the color reappeared the acid bath was repeated. After further washing in water, if apparently colorless, it was soaked in absolute alcohol for five minutes, counterstained with methylene blue, washed, dried and mounted in xylol balsam.

A synopsis of results shows:

Squames and pus cells present together	41
Squames alone	21
Pus alone	38
Bacteria—	
Staphylococci	41
Diplococci	20
Streptococci	7
Bac. proteus vulg.	14
Mic. tetrag.	4
Bac. coli.	3

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(1) Arch. Ital. di. Otol. vol. xiv, N. L.
(2) Jour. Laryngology, Rhinology and Otology, March, 1903.

Gonococci	33
Bac. subtilis	2
Aspergillus nig.	1
Leptothrix	1
Diphtheria (Klebs-Loeffler)	1
Yeasts	1

After a full description of the methods used in preparing the specimens for examination, he concludes:

1. That this investigation shows that acid- and alcohol-fast bacilli are demonstrable in a large proportion of chronic purulent ear discharges.
2. That in seventeen cases they were presumably tubercle bacilli, in so far that they conformed to the recognized morphologic and staining characters and were for the most part associated with reliable clinical evidence of tuberculosis.
3. That in seven (pseudo-tubercle bacilli) cases, while conforming in a greater or less degree to the staining requirements, they were morphologically unlike tubercle bacilli, yet five of them had either a family or personal history of phthisis.
4. That success in their demonstration in a great measure depends upon the methods of collecting and staining, together with perseverance in search.
5. That in the peculiar selective action of the squames in retaining the carbol-fuchsin—a property specially attributed to certain bacilli—we have at once a possible source of error in diagnosis and an explanation of the peculiar affinity of other bacilli for fuchsin.

MASTOID DISEASE.

In reviewing otologic literature from year to year one is impressed with the ever increasing number and extent of articles on the subject of mastoid disease. The question has been raised as to whether mastoid disease is more prevalent in recent than in former years. While it is true that influenza has been accountable for a considerable increase in suppurations of the middle ear, the real cause for the apparent increase is the fact that cases are now recognized and operated upon which were formerly left to nature with the possible help or hindrance of ill-directed efforts on the part of the physician. The advance made in the surgery of the temporal bone has been compared to the surgery of the right iliac region. A better understanding of the pathologic conditions, the surgical possibilities, and the indications for surgical intervention, in diseases of both the mastoid and the right iliac region have greatly increased the number of cases which now come to operation.

The statistics of the earlier operators showed a greater mortality than do those of the present. Prof. Schwartze reports a mortality of 20 per cent in his first one hundred cases operated upon previous to 1883. The lowered mortality is due to better asepsis, improved technic, and also to the fact that formerly only desperate cases submitted to the operation. Since Schwartze reported his cases and described his operation there have been many modifications, most of them bearing the name of the originator.

The *variations in the course of the facial nerve* through the temporal bone is a subject of great interest and importance to all ear surgeons. That the nerve does sometimes pursue an anomalous course cannot be denied; although the cases where the variation from the normal is sufficient to account for or to excuse an injury to the nerve during operation, are certainly very rare. The descending portion of the nerve, which is its most important part from a surgical standpoint, B. Alex. Randall[1] finds almost universally perpendicular, and to occupy an almost constant relation to the inner end of the auditory canal. One hundred skulls were examined in one series and practically no variations in its course were found.

The *anatomic arrangement of the facial nerve* in its relation to the mastoid operation is stated by H. E. Jones[2] as follows:

1. If we bear in mind this constant relation of the nerve to the tympanic ring, we shall not be led to think, in dealing with bones in which the tympanic bone and the mastoid process are more or less rudimentary, that the facial canal is farther in than it really is, and shall be independ-

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(1) Archives of Otology, April, 1903.
(2) Jour. Laryngology, Rhinology and Otology, June, 1903.

ent of measurements from the surface. As Stiles has pointed out, the nerve in young children is exposed to danger at its exit from the stylo-mastoid foramen, even from the knife used in incising the soft parts.

2. The angle of inclination of the facial canal, the point at which it intersects the plane of the tympanic ring, and the relation of its lower part to the highest point in the curved floor of the external meatus, enable one to tell how much of the wall of the osseous meatus can be safely removed in the Stacke-Schwartze operation.

3. The outward and backward inclination of the facial canal brings it into relation in its lower half with the petrous and deeper mastoid cells. It therefore behooves one to be careful in scooping out the deeper anterior cells in an acute abscess, such as occurs in influenza. The knowledge of the relation of the nerve posteriorly to the highest point of the meatal floor is also of value when a sinus has formed between the meatus and the mastoid cells.

4. The proximity of the nerve to the middle part of the tympanic ring and the floor of the *iter* exposes it to danger during the introduction of Stacke's protector, either by its point entering the sinus tympani instead of the *iter* or by backward pressure on the floor and inner wall of the *iter*. The lines and angles here given furnish the necessary guides for avoiding this danger. Finally, the very free removal of the external bony covering of the antrum and tympanum which these guides permit should afford a good view of the inner and posterior wall of the tympanum, where, after all, the nerve is most frequently injured as it crosses the sinus tympani and fossa ovalis, and thus should contribute to the safety of the nerve if curetting or burring of the tympanum and *iter* is left to the last.

[After all the measurements have been taken and the average computed there is still but one safe way to avoid the facial nerve, *i. e.*, know where the nerve is, then keep away from it. An accurate working knowledge of the location of the nerve can be obtained only by a considerable number of dissections and operations on the cadaver. Probably in no line of surgery is cadaver work more necessary than in mastoid surgery. Here, "to see" is frequently "to destroy." Hence the necessity of seeing the structures in the cadaver in order to know where they are without seeing them while operating.—ED.]

In order *to avoid accidental injuries to the facial nerve* while removing the posterior wall of the meatus, H. Schwartze[1] recommends that the blows of the mallet on the chisel should be careful and gentle, not at a right angle, but at an acute angle to the posterior wall. The chisel should be used to cut and not to pry out pieces of bone; the bent probe should be frequently used between the blows. The beveled edge of the chisel should be so turned that its tendency would be to get shallower rather than deeper. The chisel used in this way will be least likely to injure the nerve.

P. D. Kerrison[2] has *measured thirty temporal bones with special reference to the mastoid antrum.* Sections were made, bisecting the mastoid cortex in a vertical line passing through the posterior boundary of the triangle of election, and cleaving the bone from before backward in a plane diverging from that of the posterior wall of the meatus by an angle of 30 to 35 degrees. These sections in every case exposed the antrum, and made it an easy matter to measure the thickness of the bone separating it from the mastoid cortex.

The measurements thus obtained seemed clearly to prove three facts, viz., 1st, that in different temporal bones much greater variations exist as to the length of the bony meatus than are noted in most text-books; 2d, that the depth of the antrum is always less by actual measurement than the postero-superior canal wall; and 3d, that the depth of the antrum rarely, if ever, exceeds 15 mm., or about ⅝ inch.

In the thirty bones examined, the length of the postero-superior canal wall varied from 12 mm. to 18 mm., as follows: in three it was 12 mm.; in three, 13 mm.; in eight it was 14 mm.; in five, 15 mm.; in eight, 16 mm.; in two, 17 mm., and in one it was 18 mm.

In the same bones the depth of the antrum varied from 6 to 15 mm.

From the measurements Kerrison concludes:

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(1) Arch. für Ohrenheilkunde, December, 1902.
(2) Archives of Otology, June, 1903.

1. That in operation upon the mastoid process the antrum should always be approached from the nearest point upon the mastoid cortex, which in the great majority of bones is the small triangular space just behind the spine of Henle.
2. That this point of attack not only furnishes a guide to the site of the antrum, but also gives fairly accurate data as to the depth beyond which it is not safe to proceed.
3. That the depth of the antrum is always less than the length of the postero-superior wall of the meatus; that in the great majority of bones it is not over 12 mm., is often very much less, and is never greater than 15 mm., or $\frac{5}{8}$ inch; and therefore,
4. That in a surgical attempt to expose the antrum a depth of $\frac{5}{8}$ of an inch should be regarded as the extreme limit of safety.

P. McBride[1] goes fully into the history and *technic of operations* on the temporal bone for suppurative ear disease. He gives the German otologists credit for originating most of the various mastoid operations, but he thinks the English operators have rather taken the lead in brain and sinus surgery.

W. C. Braislin[2] classifies the *different stages of mastoid inflammation* as, acute, subacute, and chronic. In the first stage of an acute attack there may be no external swelling of the mastoid, with the possible exception of cases in early childhood, in which sometimes the inflammation has rapidly extended along the superior canal wall between the bone and periosteum, causing external swelling over the mastoid very early, with some displacement of the auricle outward and forward.

The pain in the ear is severe. Often it ceases on the occurrence of a discharge but it recurs in spite of the continuing free discharge; or the discharge may have become scanty or ceased. It has been stated that a change in the localization of the pain frequently marks the extension of the inflammation from the ear to the mastoid.

Tenderness of the mastoid to pressure is characteristic and rather general. Two points of especial tenderness are

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(1) British Med. Jour., Oct. 31, 1903.
(2) Medical News, Dec. 27, 1902.

those over the tip of the mastoid apex, and over the supra-meatal triangle of MacEwen, that is, immediately above and behind the attachment of the ear to the head. A temperature from slightly below normal to 104° F. may exist, though unless complicated with la grippe or other inflammatory conditions, it is not often so high. Chills or chilliness may be present or absent. In the severe forms, pain may radiate from the ear over the side of the head, backward to the occiput, upward to the vertex and forward to the frontal region.

Headache and sleeplessness are usually marked symptoms; vertigo may be present. There may be vomiting, and this may be regarded as a grave symptom in any case of mastoiditis, especially in the acute form and early in the disease, though perhaps less so in children, unless of an expulsive variety.

The roof of the attic of the tympanic cavity, as is well known, is occasionally congenitally perforate or lacking and early expulsive vomiting points to rapid involvement of the intracranial structures through this or some other abnormally patent opening. In the acute stages of mastoiditis, inspection may reveal a reddened membrane bulging in the region of the upper and superior quadrant, the so-called membrana flaccida, or this part of the drum may have already ruptured, showing a pouting perforation, from which as pus is mopped away with a cotton pledget, beads of pus may be seen to exude drop by drop. The outlet at the perforation seems insufficient. Even at this early stage there may be seen some falling of the posterior superior canal wall close to the drum attachment, owing to burrowing of the pus outward at this point or to edema from inflammation of the bone cells or antrum. A small perforation or a bulging of the membrane at this point demands a wide and free incision at once.

The circumstances surrounding any given case, particularly the opportunity for keeping careful watch of it, the severity of the symptoms, as well as the number of symptoms, present the chief guides for determining the decision in each case. Extreme and continued pain over the mastoid, varying temperature, tenderness of the mastoid, usually very marked in acute stage, and general prostration, especially in the presence of an already ruptured drum membrane, are indications for an operation which should certainly not be postponed for more than 24 hours.

Subacute Mastoiditis. The class of cases which may be designated as subacute comprises many which have been watched and treated through the first week of the disease, or longer, and in which the severity of the symptoms did not seem to justify immediate operation, but which did not clear up, though they may for a time have seemed better.

The pain is of a rather different character from that at the beginning of the attack. It is not so constant. It may intermit for a day or longer when, in spite of some fever, the patient feels comparatively well, and entertains no thought of a relapse; nevertheless the pain, during the attack, is intense and there is constant tenderness to pressure. The tenderness is apt at this time to be most marked at the tip and close behind the ear just over the mastoid antrum. During the attacks of pain the face shows symptoms of the physical and mental strain; it is drawn, and has the unmistakable look of one suffering deeply. The pain shoots to the vertex, to the occiput or to the frontal region. The attacks of pain may be of long or short duration. Between the attacks, which may be absent for hours or days, the patient looks bright and is cheerful and frequently states that pain is almost gone; but on inquiry it will be found that the night's rest is broken, and that the cause is due to the feeling of soreness of the head.

The discharge may have ceased; it is usually slight at this stage but occasionally it is very profuse.

The temperature chart shows an irregular curve varying from a degree or so above, to slightly below, normal.

In most cases there is less prostration than during the onset of symptoms. The patient may be able to go out of doors, and perhaps asks to be allowed to get back to work or go to school. If he does either, the pain and other symptoms become more marked. Almost any measure will check or control the pain at this stage for a time. Local abstraction of blood, the ice-bag or in some, dry heat is soothing and comforting. A practice which is considered highly undesirable at this stage, is the administration of a course of opiates. This masks pain, while perhaps pus is slowly burrowing to the dura or, it may be, forming an infective thrombus in the lateral sinus.

The history of the patient, his general physical appearance and particularly a study of the temperature chart for the few preceding days will now lead to a determination, in favor of, or against, operation.

Chronic Mastoiditis. In the third class of cases of mastoid inflammation are included all those in which there is a previous history of mastoid disease or in which a continuously discharging perforation from the attic region of the tympanic cavity favors the belief that long-continued disease of the antrum has existed. This class includes also cases in which a discharge occurs through a sinus opening in the mastoid cortex. In almost all a discharge from the auditory canal is present, though sometimes it is so slight as to be mistaken by the patient for natural ear wax.

The patient usually suffers at intervals from attacks of pain. These may not be severe but are usually sufficient to occasion more or less wakefulness at night. In the intervals between attacks he seems not incommoded and pursues his avocation. All varieties of destruction of the tympanic membrane may be present. The drum may be cicatricial, perforated or entirely lacking. The ossicles may be necrosed in part or lacking.

In some of the cases the inner wall of the mastoid apex is thin and necrosis of the bone sometimes takes place here, the pus rupturing into the digastric fossa. This form of the disease is apt to appear as a tense but illy defined swelling beneath the sterno-mastoid muscle extending for some distance in front of and behind it. Pain in the neck and at the tip of the mastoid occurs; less marked over the antrum.

Sclerotic changes in the bone due to prolonged suppuration seem to favor extension to the intra-cranial structures and a history of repeated attacks of pain behind and about the ear with scanty but continuous discharge is usually regarded as good ground for a mastoid operation. Headache of intense character even without mastoid tenderness in cases with the above history is significant of beginning intracranial involvement.

Summary. The symptoms of greatest significance in leading one to undertake immediate operation are: (1) Pain, continuous and severe, making sleep impossible, and radiating upward along the side of the head to the vertex, backward to the occiput, or more rarely, forward to the frontal region; (2) the temperature even in children does not often keep at a high point after the first days of acute illness, but is often markedly irregular; (3) a falling of the posterior superior wall of the external auditory canal. This is caused by edema of the periosteum and tissues over the mastoid cells or may be due to the actual burrowing of pus. It is possible to mistake this condition for furuncle of the canal and vice versa; (4) tenderness over the mastoid is the rule in cases calling for operation, but there are exceptions. Other severe symptoms may be present pointing to perforation of the tegmen tympani.

Some operators go to the extreme of believing that an exploratory mastoidectomy is justifiable at any time. Operations are in this way often done in acute cases, which would recover completely without operation, but such a course is infinitely better than running the risk of intracranial mischief.

B. H. Potts[1] thinks *too much importance is attached to the presence or absence of swelling behind the ear.*

Having eliminated the possibility of glandular involvement or of a furuncle or other inflammation of the external ear, we know that this swelling is a symptom of inflammation in the antrum or mastoid cells; but that this inflammation may exist in deeper tissues without the presence of swelling has been proven frequently. Many cases have been seen in which this swelling disappeared coincidently with a free flow of pus from the canal; unfortunately, this is regarded by the patient, and sometimes by the physician, as a great improvement, and they rest satisfied until further, and generally more serious, trouble follows. Its true meaning is simply this: the pus has found a passageway for itself through the tympanum or through a sinus and thus evacuated the abscess cavity; but the inflammation of the deep tissues, which is the cause of the pus, still continues active. To consider a suppurative mastoiditis well, or even improved, simply because the swelling has disappeared, is a decided mistake.

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(1) Am. Jour. Med. Sciences, July, 1903.

Wilde's Incision. Wilde's incision, which was formerly so often resorted to, seems to have rightfully fallen into disrepute. While some cases have gone on to a complete recovery after a deep long incision behind the ear, many more have been only temporarily relieved of the acute symptoms, while the discharge from the ear has continued, or a more radical operation has been required later.

J. M. Ray[1] reports four cases to show the *inefficiency of Wilde's incision.* One of the cases resulted fatally. Ray thinks that had the cells and antrum been opened at the time of the Wilde's incision, the fatal termination would have been avoided.

While admitting that a certain number of cases of mastoid periosteal abscess, both in the child and in the adult, will heal after an evacuation of the pus, he is convinced that the operation has no influence on the suppurating focus in the middle ear, and if nothing further is done and the skin incision heals, a chronic suppuration is established in practically every case and later grave complications may follow. On the other hand, if the mastoid is opened and the middle ear drained, the suppuration is checked and the ear returns to nearly the normal condition. The fact cannot be too strongly emphasized that the antrum is involved in almost every case of acute suppuration in the middle ear, and if caries exists it is sure to take part in this process; therefore, any surgery directed at an amelioration of the condition in the ear must contemplate an opening up of this cavity.

If drainage of the pus from the middle ear is to be accomplished, opening of the antrum, the one cell space always communicating with the tympanic cavity, is necessary.

In the treatment of *acute mastoiditis,* S. F. Snow[2] recommends the *internal Wilde's incision.* The opening should be made freely starting the knife near the lower margin of the drum membrane, carrying it well through to the inner wall, up and out through the attic to bone tissue, then cutting deeply out along the posterior superior wall of the

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(1) Laryngoscope, October, 1903.
(2) Jour. Am. Med. Assoc., Jan. 31. 1903.

external canal. The latter portion of the incision not only drains the attic, but it relieves the periosteal tension at the point most needed, the lower wall of the mastoid antrum. This well-known paracentesis and internal Wilde's incision becomes, in a measure, a substitute for the more radical external operation by chisel and curette if thorough after-treatment be carried out.

The congestion is much relieved by the opening thus made. Sometimes reparative processes close up a portion of the opening too early, so that we find tenderness, fever, etc., returning after one to three days, which is easily subdued by a fresh incision. Cold or heat will not avail unless drainage be free.

In neglected cases the effects of abortive attempts must be carefully scrutinized, and unless unmistakable improvement is noted within twenty-four to thirty-six hours the securing of a still better drainage is imperative.

Schwartze's Operation. The *Schwartze operation is applicable only to cases of acute mastoid abscess.* The operation is concisely described by A. O. Pfingst[1].

After shaving a sufficient area about the mastoid, preparing the parts according to surgical rules and irrigating the meatus thoroughly with bichlorid solution 1-3000, an incision is carried about ¼ inch behind the attachment of the auricle, from the tip of the mastoid to a point a little above the auricle. The incision is made through all the soft parts, including the periosteum. The mastoid is stripped of periosteum by scraping it forward and backward until a good field is exposed for operation. The anterior portion of the mastoid, the posterior wall of the meatus, the supra-meatal spine and the linea temporalis should be clearly brought into view, the soft parts being separated by retractors. The antrum is then exposed by removing with chisel and mallet the cortex bone covering it. If a fistulous opening exists, it can be taken as a guide, otherwise a point just behind the external meatus and just below the temporal ridge, the supra-meatal triangle of MacEwen, should be selected for entering the antrum. The area of cortex removed would have for its upper limit the

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(1) Louisville Monthly Jour. of Med. and Surg., January, 1903.

linea temporalis and the supra-meatal spine would about mark the middle of its anterior limiting border.

The thickness of the layer of cortex covering the antrum differs in different subjects. It is a good rule in searching for the antrum to remain close to the posterior wall, and by frequently feeling the way with a probe, to work inwardly and slightly forward until the antrum is reached. Sometimes, though exceptionally, it is ½ inch or even farther from the surface. When situated deeply it becomes necessary to work very cautiously, bearing in mind the importance of hugging the posterior wall of the ear canal. By working too far backward there would be danger of wounding the lateral sinus, which is often situated far upward; the danger of entering a deep-seated middle cerebral fossa is apparent. The facial nerve and the horizontal semi-circular canal are avoided by keeping well above the spina. After the antrum has been exposed, all overhanging edges of bone should be removed, the cavity well cleansed with a curette and the wound packed with gauze.

This operation is indicated:

1. In all cases of mastoid osteitis secondary to otorrhea, if after several days of antiphlogistic treatment, the inflammation shows no tendency towards resolution. The mastoid inflammation is indicated by pain, usually severe, in the region of the mastoid, sensitiveness to pressure with tumefaction and redness of the soft parts behind the auricle, and at times sinking of the superior-posterior wall of the auditory canal. When pus has perforated the cortex of the bone a fluctuating tumor is felt behind the ear.

2. In primary mastoid inflammation, as evidenced by pain and tenderness in the region of the mastoid and bulging of the posterior wall of the ear canal, if free incision of the swollen meatus fails to relieve the symptoms.

3. In those cases of purulent otitis media in which symptoms arise indicating involvement of the brain, its membranes or sinuses. Even without symptoms referable to the mastoid, the cells should be opened and secondary complications looked for.

4. In cases of protracted otitis with discharge and slight elevation of temperature which shows no tendency to lessen

in four or five weeks, even if there are no other symptoms of mastoid empyema.

5. Cases of obstinate neuralgia referable to the mastoid with or without persistent otorrhea are often due to a sclerosed condition of the bone (obliteration of the cells) and are relieved when the antrum is opened and the attic ventilated. It may be worthy of mention in this connection that removal of a portion of the cortex sometimes relieves these cases.

In the Schwartze operation, as modified by Stacke, the posterior and superior wall of the auditory canal is removed and the auditory canal, the middle ear, the attic, and the mastoid are made into one common cavity, which is expected to become lined with epidermis.

This operation is indicated:

1. In chronic cases of otitis media not relieved by careful and persistent treatment of a less radical character. Other conditions which would influence the surgeon in this class of cases are the continuation of a bad odor after thoroughly cleansing the middle ear, or a constant or intermittent pain in or about the mastoid.

2. In protracted cases of chronic otorrhea in which symptoms indicating intracranial complications arise.

3. In chronic cases of purulent otitis media accompanied by cholesteatomatous formation. When the cholesteatoma is extensive it can often be seen through the ear canal, otherwise the first signs of it are noticed in the pus.

4. In all cases of extensive caries, with or without fistulous openings in the mastoid or the posterior-superior osseous canal.

Although these indications can be followed in a general way, each individual case should be governed by its own symptoms. So we shall find cases of acute mastoiditis with but little pain, coming on so insidiously that the patient is able to follow his vocation. Such cases are characterized by restlessness, particularly at night, and pronounced headache. Prostration is a symptom of nearly all cases of mastoid involvement. The temperature of the patient is, as a rule, not a guide. As it often remains unaffected, the absence of fever would not exclude the possibility of mastoid involvement. A rise in temperature, however, should be taken as a significant symptom. In children, mastoid involvement is nearly always indicated by a rise in temperature. Even the presence or absence of otorrhea is not a guide in determining whether the mastoid is inflamed. Although it is the rule for the otorrhea to stop, usually suddenly, when the mastoid becomes inflamed, it is not unusual to have an extension of the inflammation to the mastoid cells without affecting the quantity of discharge from the ear. Mastoid inflammation may occur, though infrequently, in subjects who have never had a running ear.

In the preparation of a patient for a mastoid operation L. J. Hammond thinks he should be placed in bed if possible twenty-four hours before the operation, diet being restricted to milk, and the bowels freely opened; if a female, the head on the side to be operated on is to be shaved, while in the male the entire head should be shaved. The entire head in both instances should be thoroughly scrubbed with soap and water, then alcohol should be applied, followed by a mercury bichlorid solution, also bichlorid dressing over the entire head. Auditory canals are syringed with 1 to 2,000 bichlorid solution several times before time of operation. The nasopharynx is also thoroughly cleansed several times with alkaline solution of about the same specific gravity as the blood.

When the patient is anesthetized, the dressing about the field of operation is cut away, the remainder being left to cover the entire scalp. The auditory canal is again thoroughly washed with a saturated boracic acid and the field the field of operation again washed with mercury bichlorid, 1 to 2,000.

The *rotary burr as a means of excavating the mastoid process* has in the past had numerous advocates, but Strum[1] calls attention to the dangers attending its use.

The chief disadvantage seems to be the heat generated by the rapid rotation of the burr. In numerous cases this heat has resulted in necrosis of the bony wall of the operation cavity.

[While the advocates of the burr have enthusiastically recommended it, especially for smoothing the walls after an operation, it has never seemed to the editor to be a

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(1) Archives of Otology, December, 1902.

necessary part of the mastoid operator's equipment. With ordinary skill and experience in the use of chisels, gouge, forceps, and curette, there ought to be no necessity for the burr even for smoothing the walls.]

C. Barck[1] reports 100 *mastoid operations.* They include operations both in hospitals and in private residences. He offers the following statistics:

Of the 100 cases, 91 recovered and 9 ended fatally.

There was a slight preponderance of the left side over the right, the left being affected 51 and the right 49 times.

The ages varied from 4 months to 63 years; 42 were below the age of 15, among them 5 babies.

Two cases were "primary" mastoiditis, without previous involvement of the middle-ear.

Bezold's form was encountered twice.

Cholesteatoma was found in 5 instances.

Caries with exfoliation of the entire labyrinth occurred once.

For osteo-sclerosis one operation was performed.

Subperiosteal abscess was present at the time of the operation, 14 times.

Facial paralysis was met with in 5 cases.

The healing process required 4 weeks in the shortest instance, and nearly 6 months in the longest.

Subsequent operations became necessary in 6 cases; a second in 4, and a second and third in 2.

Erysipelas followed the operation twice, both cases ending in recovery.

The intracranial complications were as follows: Subdural abscess, 2; sinus thrombosis, 5; brain abscess, 3; meningitis, 4; among them 2 were tubercular. In one of the above cases there was sinus thrombosis and cerebellar abscess present.

M. Kamm[2] reports a case of *acute mastoiditis complicated by scleroderma.* During the course of an acute otitis media the patient complained of severe pain in the left mastoid process, especially when the head was rotated in the opposite direction. The skin below the mastoid process, down to the clavicle, was thickened and hard. A Bezold mastoiditis was immediately suspected, though this diag-

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(1) Laryngoscope, November, 1903.
(2) Archives of Otology, April, 1903.

nosis was given up after the other side of the neck had been examined, where in the absence of any otitis, the skin of the neck was in the same condition. On further examination, the skin all over the body was found to have this same board-like consistence, except on the abdomen, the buttocks, and the lower extremities. The consistency of the abnormal skin was something like that in the frozen cadaver which cannot be indented with the finger nor be raised in a fold.

When a mastoid operation was performed later the incision through the skin gave rise to an unusual venous hemorrhage. Recovery, while tedious, did not seem to be retarded by the scleroderma.

H. L. Secord[1] reports a case of *exophthalmos accompanying mastoid operation.* Following the operation the exophthalmos disappeared and the patient made an uninterrupted recovery.

J. H. Claibourne[2] reports two cases of *persistent fistula* behind the ear after mastoid operation. In one case the fistula was intentionally kept open, while in the other Claibourne thinks the long continued packing had much to do with it.

[The Editor believes that packing can be kept up too long after mastoid operations, especially in tympano-mastoid cases with immediate closure of the posterior auricular incision. After three or four weeks they seem to heal more rapidly with only a slight pledget of cotton in the meatus.]

The question as to *how much hearing a patient will probably have after a tympano-mastoid operation* is one which is frequently asked. E. Buhe[3] thinks the results which have been published are unreliable and cannot be compared, because up to the present time there is no uniform method of examination in practice. The general opinion on the influence of the radical operation on the hearing is much too favorable, and does not seem to be correct.

As a result of his experience he makes the following estimates:

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(1) Annals of Otology, Rhinology and Laryngology, November, 1902.
(2) Laryngoscope, January, 1903.
(3) Archiv für Ohrenheilkunde, vol. lxi, p. 289.

1. An improvement in hearing, or stationary hearing, follows radical operation generally in the cases in which the labyrinth or labyrinthal walls are intact and the hearing for whisper is under 1 metre.
2. An improvement always takes place when obstruction of the canal is present before the operation.
3. No improvement in hearing, or stationary hearing, is to be expected if the labyrinth and labyrinthal walls are diseased, or if only a very slight remnant of hearing is present before the operation.
4. Diminished hearing occurs in almost all patients who hear at 1 metre or more, before the operation, even if the labyrinth is healthy and remains so.
5. Deterioration of hearing occurs when the labyrinth and labyrinthal walls are diseased and the hearing power for whisper is between .25 m. and 1 m.

Osteosclerosis of the mastoid is a condition frequently found associated with or following long continued suppuration of the middle-ear. The condition is often the cause of obscure pain about the ear. The pain is sometimes ascribed to hysteria, or neurasthenia, or neuralgia from some other cause. The symptoms of osteosclerosis, according to O. J. Stein[1] are mainly centralized into that of pain. In the uncomplicated variety of this disease the almost negative results of the examination strengthen the diagnosis. On inspection of the drum membrane, most likely nothing of any note will be seen, although it may show the usual changes that are present as a result of a former otitis media catarrhalis or suppurativa. The retroauricular region seldom shows anything pointing definitely to the involvement of the interior. In some cases, particularly when accompanied by a chronic suppuration of the middle-ear, or in cases of cholesteatoma and also in the formative stage of the simple variety, we may discover a slight redness of the overlying skin and a light degree of edema. Firm pressure over this area will discover a spot, usually located on a line with the meatus, that elicits a sharp sensation of pain. The tenderness is not limited necessarily to this region, but at times it may extend over quite a large area. But what is particularly

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(1) Archives of Otology, June, 1903.

worthy of note is that the auricle, integument lining the auditory canal, the region in front of the tragus and just beneath the lobe of the ear, are not at all sensitive to the touch.

The pain complained of by the patient is almost always continuous and extends over a long period, from days into weeks, and weeks into months, with only remissions, but seldom intermissions; although at times by the mere fact of its long continuance, the patient may become so accustomed to the milder stages of the pain as to be apparently unconscious of its presence.

The pain is accompanied at times by sudden exacerbations of an acute throbbing or boring character, deeply seated in the ear and mastoid process. In some instances it may radiate up to the side of the head and down into the neck and again back to the occiput, but as a rule, it is not associated with pain in or anterior to the meatus.

Deafness may be complained of according to the amount of involvement of the conductive or perceptive apparatus.

Usually there is an absence of tinnitus and vertigo. A slight rise of temperature may be noted in the early stage of the disease when the new bone tissue is forming, but later, during the hardening period, it is never present. Age does not seem to bear any causative relationship to the disease.

[The diagnosis of osteosclerosis is more or less uncertain, although by auscultation with the stethoscope and tuning fork a number of cases have been diagnosed and later the diagnosis has been confirmed by operation. Ed.]

J. Dunn[1] reports a number of cases of *severe mastoid pain not due to empyema or osteosclerosis.* The first two cases were relieved by the administration of iodid of potash. The next two cases had symptoms so similar that they may be considered together. In both the pain was caused by la grippe. Both patients were young. Both were examined to see if mastoid disease was not the cause of the severe constant pain and tenderness in the post-aural region. In cases 1 and 2 the surface of the mastoid itself was hyper-sensitive on pressure. In cases 3 and 4 the pain, although referred by the patient to the region

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(1) Virginia Medical Monthly, June, 1903.

back of the ear, was found to be evoked only when the region along the posterior part of the upper insertion of the sterno-cleido-mastoid was pressed upon. In both of these cases the temperature curves were erratic, showing at times several degrees of fever; in both there were throat and nose symptoms; in both the pain behind the ear was severe and did not yield to external applications; in both it had continued several days before the patients were examined. In neither case was there any visible evidence of middle-ear inflammation, the ear drums in both cases being normal in appearance and the hearing normal. The point of greatest pain on pressure was just over the exit of the mastoid vein, along the posterior border of the process.

The first two cases had what might be called the "mastoid expression", so commonly is it seen in cases of osteitis acuta of the mastoid process. In neither of the latter cases was there present this expression, which is made up of facial expression, position of the head and body. It cannot be put into words, but it is sufficiently characteristic for one who has seen it several times to be able thereafter to suspect the nature of the trouble before he examines carefully either the middle-ear or the mastoid region. On moving the patients' heads they would sometimes complain of a sharp sickening pain in the shoulder or in the clavicular region. It was at once suspected that the postmastoid pain was part of an affection similar to the common "crick in the neck", and that it was but one of the little figures in the kaleidoscopic picture la grippe offers for the entertainment of us medical folk. In both cases the pain disappeared along with the general trouble.

These two cases are worthy of further consideration. Suppose there had been in addition to these symptoms, a purulent middle-ear inflammation. Every indication for opening the mastoid would have been present—fever, evidences on the tongue and in the breath of systemic infection, tenderness on pressure, a running ear, severe, constant, unyielding, subjective pain. Indeed, we might well have suspected involvement of the sinus, considering the erratic fever curve and the point of greatest tenderness on pressure. It has sometimes happened that in just such cases the mastoid has been opened, and, to the surprise of the operator, nothing found to explain the symptoms. In just such cases as those, no doubt, operation has, from time to time, been advised, the patient and his friends have been told that an operation offered the only hope of a cure, no operation was, however, permitted. The patient got well, and the specialist's word was ever afterwards subject to a discount by patient and family.

Cancer. C. E. Munger[1] reports a case of *epithelioma of the mastoid following suppuration.* Two months after the beginning of what appeared to be an ordinary acute otitis media, complete facial paralysis occurred. When a mastoid operation was undertaken six months later there was an opening through the skin over the mastoid region with exuberant granulations, also an opening in front of the tragus with similar granulations. There was complete facial paralysis of the left side. The patient was etherized and a great amount of necrosis was found. The whole posterior wall of the canal was necrosed and there was a most extensive necrosis of the mastoid process, demanding a very free operation, so much so that when apparently healthy bone was reached the finger placed in the mastoid wound easily passed to the glenoid fossa, and a probe would pass into the cranial cavity.

An examination of the growth showed that it was a squamous celled epithelioma. The patient died six months after the operation.

E. B. Dench[2] reports a case of *sarcoma of the tympanum and mastoid* in a child aged 18 months. When first seen there were some granulations in the canal, and paralysis of the sixth nerve. The tissue removed was diagnosed as granulation tissue with an epithelial covering. The mastoid was opened; a cartilaginous, cauliflower-like mass presented, breaking through the temporal bone and invading the dura. This was cleaned out. Microscopic examination revealed an endothelial sarcoma. Recurrence in the depth was expected. The case disappeared from view, and when seen five weeks later the wound had healed and recurrence apparently had not taken place. The patient meanwhile had been treated with the x-ray. Five weeks later the whole

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(1) Laryngoscope, September, 1903.
(2) Archives of Otology, April, 1903.

side of the head was very much swollen. He tied the common carotid artery in order to arrest the progress of the growth. This gave very little benefit. The tumor grew and invaded the pharynx.

C. J. Kipp[1] reports a *fatal case of sarcoma of the temporal bone.* The patient, a boy of 5 years, was brought to the hospital with a swelling behind the ear and a polypus in the canal. The polypus was removed and the mastoid opened and cleaned out. Within a month the cavity was filled with granulations which continued to grow and the surrounding structures became involved. A second operation was undertaken and considerable softened bone was removed with a curette.

After the second operation the cavity refilled in two weeks. The mass continued to enlarge rapidly. Three months later the child died. The tumor which was removed after death weighed 6 pounds 8 ounces and measured 25 inches in circumference.

[The similarity to an ordinary mastoid disease in the beginning, with the subsequent rapid growth and the large size of the tumor makes this case worthy of note.—Ed.]

OTITIC BRAIN DISEASES.

The *prognosis in intra-cranial lesions,* according to J. E. Brown[2], corresponds with what our knowledge of their pathology would cause us to infer. Without surgical intervention, in the absence of a unique or unusual course, the prognosis would be uniformly fatal. There is no reason why, if an extradural abscess is evacuated, the case should not go on to recovery. In sinus thrombosis the result depends on the early opening up of the diseased area and the cutting off of the infection from the general circulation to prevent pyemia. With septic meningitis one can see how futile any effort would be to secure a favorable termination, while in brain abscess the condition is always grave, but not without hopes of recovery.

Abscess. Regarding *brain abscesses of otitic origin,*

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(1) Laryngoscope, January, 1903.

(2) Columbus Med. Jour., August, 1903.

H. H. Hoppe[1] says: The difficulties in abscesses following caries of bone, especially middle-ear disease, are twofold. First, the difficulty in determining the presence of an abscess, not only in the acute, but especially in the latent period; secondly, of locating the abscess. In the period of acute manifestations of mastoid inflammation, especially in children, the signs and symptoms of the mastoid disease may simulate perfectly those of brain abscess. The only absolute signs before the operation of brain involvement are cerebellar signs of a positive nature, or if the left side be involved, the occurrence of sensory aphasia. In doubtful cases, however, the bone and ear diseases should first be attended to. Sinuses should be looked for and if the general signs of brain abscess do not clear up after the operation, then a secondary operation may be indicated. Abscesses from middle-ear trouble, are, however, notoriously latent, and this fact gives us great difficulty.

If the roof of the middle-ear is diseased the abscess is in the temporal lobe. If the mastoid cells or the posterior part of the petrous portion of the temporal lobe is the seat of inflammation the abscess is in the cerebellum; the middle lobe of the cerebellum is involved if the purulent inflammation passes through the semi-circular canals. Bergman speaks strongly in favor of the above method of localization.

Another point in diagnosis is that otitic suppuration when associated with a cholesteatoma, whether the latter be primary or secondary, is more apt to cause abscess of the brain than an uncomplicated one. The cholesteatoma penetrates the bone; in its growth, ramifies the Haversian canals for a considerable distance around its base; makes the bone thin and friable; fills it with large cavities, and in this way renders the corrosion an easy matter and paves the way for an abscess. In addition to this the pus is dammed back by the cholesteatoma and the breaking through and the corrosion become an easily accomplished fact. Two other factors predispose to the formation of otitic abscesses; (*a*) the course of suppuration in acute or subacute exacerbations, the pus being fetid; (*b*) the

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(1) **Jour. Am. Med. Assoc., March 14, 1903.**

presence of large granulation masses acting as a dam to the pus. Thus we can obtain important diagnostic data from the examination of the ear.

When the origin of the abscess is in the roof or attic of the middle-ear, the bone having become inflamed or corroded, the first step is purulent pachymeningitis, and this is followed either by an extra- or intra-dual abscess. The intra-dural abscess is at first connected with the dura mater, afterward becomes separated by becoming encapsulated and then becomes subcortical in the temporal lobe. Often we have both extra-dural and intra-dural or brain abscesses at the same time; this is very important to remember. We can diagnose an epidural or extra-dural abscess only by the following signs: by external signs when the pus escapes either through middle-ear, through temporal bone or mastoid cells. Abundant flow of pus, of short duration, will arouse suspicion of abscess, especially if the signs of previous increased intra-cranial pressure disappear with the flow of pus. Discharging fistulæ and especially edema or fluctuating abscess over the mastoid bone lead to diagnosis of an epidural abscess of the middle or temporal fossa.

The difficulty of locating an otitic abscess is increased by the fact that middle-ear suppuration is often assocated with suppuration of the mastoid process. Then we must look for caries or ostitis, because if the latter process is either in the antrum or in the mastoid it is liable to determine the seat of abscess.

A badly located or small tympanic perforation is apt to cause brain abscess by damming back the pus. Otitic abscesses have an imperceptible and unknown (as to time) beginning; never sudden; trauma plays no rôle.

Otitic cerebellar abscesses are very difficult to diagnose and are frequently complicated with sinus thrombosis and lepto-meningitis and masked by the latter. We look for cerebellar abscesses in caries of the sigmoid fossa, of the sulcus transversus, of the labyrinth and the mastoid cells (Koch). Koch has proven that cerebellar abscesses before the age of 10 are rare (2 out of 105). Hence, prior to this age we must look for temporo-sphenoidal abscesses.

The cerebellar abscesses are found in the lateral and at times in the median surface of the hemispheres, and usually in the anterior lower surfaces, and in such a way that caries of the sigmoid sulcus causes abscess of the lateral surface and caries of the labyrinth, of the lower median surface.

Koch divides symptoms of cerebellar abscess into groups according to three types of abscess:

1. Diagnosis made from marked cerebellar focal signs.

2. Marked signs of general brain pressure with but few and indistinct focal signs.

3. Neither focal nor general symptoms are well marked, but the center of suppuration is in the mastoid region and the finding of fistulous openings through the dura leads to discovery of the abscess in the cerebellum.

The general symptoms are those of general brain pressure, but the pulse is very low, the vomiting rare and optic neuritis occurs in but one-fourth of the cases. General pressure symptoms in cerebellar abscesses are due to dilatation of the ventriculi.

In a discussion before the Otological section of the New York Academy of Medicine, J. Collins gave the following points, to be remembered in dealing with *brain abscess*:

1. Abscess of the brain, wherever situated, is practically a fatal disease, although there are a few recorded cases of spontaneous recovery; these are exceptions that prove the rule.

2. As all cases die, operation gives the only chance of recovery. There is but one way of dealing with them, enter the skull, evacuate the abscess, cleanse and thoroughly drain the cavity.

3. The cardinal symptoms of localization should not be awaited before subjecting the patient to operation. Operation should expose the most probable seat of the abscess, always bearing in mind that the location of brain abscess stands in determined relationship to the origin of its causative factors.

4. If necessary, one should "go it blind" rather than wait for focal symptoms, once the mind is made up that there is a circumscribed septic process within the cranial cavity.

F. Eve[1] thinks great credit is due the pioneers in this department of surgery, whose insight and enterprise enable us to treat these formerly fatal infections with something approaching satisfactory results. He makes the following observations regarding some of the *intracranial complications of ear diseases*:

The formation of pus between the skull and dura mater is much commoner over the sigmoid sinus, but may exist over the roof of the tympanum or antrum or over the internal auditory meatus. When in suppurative mastoiditis the antrum is dilated, it frequently happens that the thin partition between this cavity and the lateral sinus is absorbed, the sinus being then bathed in pus.

The symptoms associated with suppuration around the sigmoid sinus when its bony walls are intact are somewhat more severe, yet not so marked as might be anticipated, seeing that pus is confined under pressure in immediate contact with one of the largest venous channels in the body.

The presence of pus around the sigmoid sinus fortunately very frequently reveals itself after the mastoid antrum is exposed by the exudation of pus from a small channel opening on the posterior wall of the mastoid antrum. It is probably a small venous channel and if followed up with the gouge or burr leads directly to the purulent collection.

An extradural collection of pus above the anterior surface of the petrous bone may reveal its presence on examination with the otoscope by the dripping of pus through an opening in the roof of the attic into the tympanum. This symptom may also be present in temporo-sphenoidal abscess.

In all these cases mastoidectomy is required. A collection of pus around the sigmoid sinus can be readily evacuated by enlarging the opening in the temporal bone backward in the direction of the base line. If it be situated above the tegmen it can be opened by enlarging the osseous cavity upward in the direction of the superior wall of the bony meatus.

The deposition of a clot in the sigmoid sinus most

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(1) Lancet, Jan. 17, 1903.

frequently follows the formation of pus around it or the growth of septic granulations from the mastoid cells through the bony partition which separates them from the sinus. Or it may result from the extension of a septic thrombus along small veins which pass from the tympanum and mastoid antrum directly into the lateral sinus. Lastly, it may rarely result from the extension of a clot primarily originating in the superior petrosal sinus. The symptoms produced are general and local. The general symptoms are those resulting from breaking down and dissemination of septic clot and may be summed up as those of pyemia superadded to those of acute mastoiditis—rigors, pyrexia with marked fluctuations of temperature, vomiting, with, in some instances, symptoms of cerebral disturbance. In the majority of cases the prominent symptoms are referable to the occurrence of septic embolism in the lungs. In others the septic intoxication manifests itself in profuse diarrhea, meteorism, abdominal pain, extreme exhaustion, and a general condition which has been mistaken for enteric fever. Finally, the thrombosis may be complicated with meningitis, the symptoms of which mask those of the sinus lesion.

The only distinctive local signs are "cord like" induration along the course of the internal jugular vein due to the extension downward of the clot and periphlebitis, and tenderness at the apex of the posterior triangle resulting from thrombosis or phlebitis of the posterior cervical veins which communicate with the lateral sinus. Edema of the integument over the mastoid process is also said to be often present, but it probably is mainly due to the co-existing ostitis. It should be borne in mind that the discharge is prone to cease at the onset of thrombosis and if the case has only just come under observation, the surgeon may hesitate, in doubt if the case is really one of ear disease. Cases of otorrhea and mastoiditis with intracranial complications are apt to be associated with quite insignificant local symptoms of inflammation, because many are instances of long-standing otorrhea which has resulted in sclerosis of the mastoid bone. It may be this circumstance which determines the extension of the septic process inward instead of outward. It is evident that the characteristic symptoms of sinus thrombosis are only present in the majority of instances when the disease has reached a stage at which treatment is almost hopeless. Our aim should be to recognize the disease before the clot has commenced to disintegrate. A clot may be recognized readily by palpation. Where doubt exists as to the presence of clot the sinus should not be merely punctured with a trocar, but should be opened. Free bleeding follows, but is effectually stopped by a compress of gauze. When a clot is clearly present the internal jugular vein should be ligatured first and subsequently the sinus should be incised and the clot removed. If it be breaking down it may be necessary to flush the jugular vein by injecting from the skull into the wound in the neck.

Cerebral abscess may occur in two situations in ear disease: the temporo-sphenoidal lobe and the cerebellum. Certain general symptoms are common to abscesses in both situations; vomiting having no relation to food, intense pain sometimes of a paroxysmal character, foul breath, rigors varying from slight chill to violent shivering, giddiness, and lethargy. The latter is one of the most important symptoms. The patient lies in a somnolent condition approaching that of coma, but can be roused, answers questions rationally, although the answer is delayed. There may be want of sustained attention. The temperature is usually characteristic. From the septic type which accompanies mastoid inflammation it suddenly falls to normal, and during the late hours of the night and early morning is often slightly subnormal. The pulse and respiration are generally slow.

Paresis of the face and upper extremity on the opposite side, so often present in temporo-sphenoidal suppuration, is due to the abscess extending upward or upward and inward and pressing either upon the cortex of the ascending central convolution or upon the nerve fibers as they pass from it, so that the face will be first affected, then the arm, while the leg escapes. Deafness on the opposite side from disturbance of the auditory center has also been observed, and if the abscess be situated on the left side, aphasia may exist from pressure upon the posterior end of the third frontal convolution. The patient as a rule lies with the limbs flexed and the affected side undermost, a position just the reverse of that observed in cerebellar abscess.

According to S. Oppenheimer[1] the differential *diagnosis between extradural abscess and meningitis* may be made by the high temperature, rapid pulse, irritability, general excitement, restlessness and hyperesthesia of the special sense organs in the latter, in contrast with the slow cerebration, apathy and drowsiness in the former. One may find, however, a slow pulse with a temperature of meningitis, and in such cases, both the conditions may exist at the same time. If the diagnosis still remains in doubt in the presence of meningeal symptoms, lumbar puncture should be performed and if it gives a negative result, then an epidural abscess or a sinus phlebitis, or both, are probably present. Macewen and Milligan state that the symptoms of extradural abscess always dominate and mask those of a brain abscess, when the two occur together, and it is not until the former is relieved by operation, that reliable evidence of the presence of the brain abscess can be obtained.

The two most common sites for the development of the pus collection in the order of their frequency, are first, in the posterior fossa near the vertical portion of the groove for the lateral sinus, and secondly, in the middle fossa on the superior surface of the osseous tissue forming the roof of the antral cavity. Should the mastoiditis travel backward, the perforation into the cranial cavity will probably be through the thinner tissue of the groove previously mentioned. While in some instances where the mastoid cortex is sclerosed, the tendency for the route of the infection is upward and inward and the epidural abscess thereby develops in the middle cranial fossa.

If on opening the mastoid, the pus is seen to pulsate, there is every probability that it communicates with the cranial cavity and after the diseased area here has been removed and a fistula is found it should be traced to its termination in the epidural abscess. Again in a suspected case where the diagnosis has not been fully determined, the mastoid operation is first performed in the usual manner, the vertical groove for the lateral sinus is then ex-

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(1) Med. News, Nov. 7, 1903.

posed and the sinus is examined and treated according to the pathologic changes found. The course of the sinus is then traced upward and backward to its horizontal portion, where immediately above is the middle fossa, while below is the posterior fossa. 'If the epidural abscess should be found in the neighborhood of the lateral sinus, it is evacuated and dressed in the usual manner, but if no pus collection exists at this point, a flexible grooved director may be passed cautiously in various directions between the dura and the skull, in order to locate an abscess in other positions.

E. Gruening[1] reports a case of *left temporosphenoidal abscess apparently communicating with the ventricles.* The symptoms which led to the diagnosis of abscess of the temporosphenoidal lobe were rapid development of choked disc, slow pulse rate, intense headache, and vomiting. The important localizing symptom of abscess of the left temporosphenoidal lobe, amnesic aphasia, was absent before the operation, but appeared immediately after it. Other interesting features of the case were (1) the discharge of pus from the abscess cavity followed by the flow of a clear watery fluid, evidently ventricular; (2) the rapid recovery of the patient in spite of the communication of the abscess cavity with the ventricles of the brain.

J. K., aged 17, was admitted to the Mt. Sinai Hospital on April 15, 1903. He complained of pain behind the left ear. During the past three days he had had several chills. Both ears had been discharging a long time, and the left ear always more than the right. On admission he suffered from frontal headache and photophobia. The left mastoid region was tender on deep pressure and the corresponding middle-ear was filled with granulations and cholesteatomatous masses. The attic of the right ear was also diseased. Temperature 104°, pulse 92, respiration 28.

Examination of the lungs, heart, liver, spleen, and abdomen gave negative results. The pupils were small and equal and reacted well. Ophthalmoscopically the optic discs appeared somewhat swollen, redder than usual, and the retinal veins were dilated and tortuous. Operation, April 15, 1903. Nitrous oxid and ether anesthesia. Usual incision for the radical operation with an additional cut 3 cm. in length at right angles posteriorly. Entire mastoid exposed. Cortex hard and apparently healthy. Interior of mastoid down to the apex, diploic in structure and softened. The supero-posterior wall of the external auditory canal had disappeared—the radical operation had been performed by nature. The tympanic cavity was filled with granulations, the antrum packed with cholesteatomatous material. The sigmoid sinus was far forward, only 4mm. from the external auditory canal and surrounded by diploic cells. The emissary vein was likewise imbedded in softened diploic bone structure. The sigmoid sinus and the emissary vein were laid bare. The upper knee of the sinus was covered with a thin grayish exudate, while its other parts and the emissary vein presented the normal blue appearance. The cholesteatomatous masses were removed from the antrum and the granulations from the tympanic cavity. No ossicles and no tympanic membrane were found. The antrum, very large, size of a filbert, showed a perforation through its roof. The opening measured 1 cm. in diameter. The dura mater, prolapsed into the antrum, was covered with hard granulation tissue. In the tympanic roof a small spot of discoloration was seen.

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(1) Med. Record, September, 1903.

The opening in the antral roof was enlarged by the removal of bone, including the discolored area in the tympanic roof. In the dura mater no other changes save those mentioned above were found, and no pus was encountered in the cranial cavity. A small erosion was discovered in the bone over the horizontal semicircular canal. At the termination of the operation, which lasted over one hour, the wound was irrigated with sterile salt solution, flushed with absolute alcohol, and dressed with iodoform gauze.

One week after the operation the patient still complained of headache, but was able to take nourishment. No focal symptoms; no amnesic aphasia. Temperature 89° to 100.4°. Pulse 54 to 76°. No vomiting. Late in the evening of the 24th the patient began to moan and said that his headache was unbearable. Ophthalmoscopic examination showed marked double optic neuritis (choked disc); sensorium clear.

Operation April 25. Nitrous oxid and ether anesthesia.

Wound curetted, irrigated, and treated with absolute alcohol. Incision 1½ inches upward, exposing squama. Temporal ridge and portio squama, tympanic and antral roofs were completely removed. The exposed dura was thoroughly cleansed with absolute alcohol. Aspiration through under surface of brain in region of the tympanic roof. The needle was carried one inch upward and one syringeful of thick pus was obtained. A crucial incision through dura mater and the under surface of brain was then made and gave exit to about two ounces of thick yellow pus. Finger introduced into the brain could feel limiting membrane. No irrigation of brain abscess. Drainage by narrow selvaged strips of iodoform gauze. Wet dressing. During the operation the pulse rose from 64 to 100.

April 26. Marked amnesic aphasia, which did not exist before the operation. The patient could not name objects shown him, but described their use in fluent language. Temperature 101.2°, pulse 60. Slight headache. Pupils equal. No rigidity of neck. Reflexes normal.

At the dressing of the wound, the withdrawal of the gauze was followed first by a discharge of pus, and then by a flow of a considerable quantity of clear watery fluid. After the dressing the pulse rose from 60 to 88. The symptoms of aphasia were less apparent, the patient naming several objects, but tiring after a few questions. Choked disc still pronounced on both sides. The patient made an uninterrupted and complete recovery.

Encephalitis. Voss[1] reports three cases of *encephalitis associated with purulent ear disease.* The first case suffered from aphasia and had an abnormally slow pulse after mastoid operation. The brain was incised in several directions, but no pus or softening of the brain was found. The patient recovered. In the second case a small brain abscess was found and later a prolapse of brain occurred, but the patient recovered. In the third case a woman, 55 years of age, had suffered for a week from severe pain in the right ear and on the right side of the head. Her speech was peculiar owing to marked trismus and she could separate her teeth only ¾ cm. Some tenderness over

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(1) Archives of Otol., June, 1903.

mastoid, right membrana tympani much congested and dull. Hearing lost, temperature 100.2° F. Paracentesis was deferred to the next day when the patient was to enter the hospital. She did not return until three weeks later and then was in a moribund condition.

The autopsy showed the articulation of the inferior maxilla to be normal. The dura was adherent to the pia in many places. Considerable edema of the latter over the parietal lobes. On the lower surface of the right temporal lobe there was a yellow and softened spot in the cortex, the size of a twenty-five-cent piece.

Sinus Thrombosis. W. M. Willis[1] reports a case of *thrombosis of the lateral sinus with general septic infection.* The patient, a male, aged 19 years, was admitted to the Nottingham Hospital on Oct. 11th, 1902. He complained of pain in the head and gave the following history: There had been a discharge of pus from the right ear for nine years, it having followed an attack of scarlet fever. One week before admission he was seized with sudden illness and suffered from shiverings, vomiting, and intense pain in the head. Coincidently, he stated, the discharge from the ear ceased. His condition on admission was as follows: The temperature was 102.8° F. He had pain in the head, especially on the right side, stiffness and tenderness of the muscles of the back of the neck, and some retraction of the head. There was an indistinct fulness to be felt in the neck high up just below the mastoid process. His condition remained much as described until Oct. 18th, when for the first time since admission, he had a rigor which lasted for 29 minutes and the temperature rose to 105.2.

During the time he had been in the hospital there had been no rigors other than mentioned, yet there had been an extremely oscillating temperature. In addition to the temperature there were present headache, purulent discharge from the right ear, tenderness and stiffness of the muscles of the back of the neck, and a fulness down the upper half of the anterior border of the sterno-mastoid on the right side. There was no optic neuritis.

Having made a diagnosis of lateral sinus thrombus a

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(1) Lancet, June 13, 1903.

semilunar flap was made; one end of the incision being just behind the ear, the other nearer the occipital protuberance. The pinna was drawn well forward, exposing the bone to the margin of the external auditory meatus. The mastoid antrum was opened and cleared of a small quantity of inspissated pus. The next step consisted in trephining over the lateral sinus, exposing it by the removal of a half-inch disc of bone. An incision into the sinus revealed the fact that it was full of clot. Leaving the skull, an incision was made in the neck exposing the internal jugular vein, which was found to contain a thrombus. The vein was ligated as low as possible, and about 1½ inches of vein above the ligature was removed. The sinus was then opened, and after removing the clot, was syringed with sterilized water through to the opening below. Bleeding now became free both from the sinus and the jugular vein. The latter was therefore ligated and the former was plugged with gauze, the hemorrhage being thus easily controlled. The skull flap was then stitched into position, gauze plugs being in the sinus and in the mastoid antrum, the ends of these issuing from the respective angles of the wound. The wound in the neck was then closed, which was a mistake, as it suppurated later and had to be completely reopened; no harm, however, ensued.

By this complete operation nearly the whole of the septic clot was removed, and in addition the main supply of septic material was cut off from entering the general circulation.

Following the operation he had repeated rigors and a fluctuating temperature. Two weeks later, the symptoms continuing, it was decided to improve his condition by the injection of normal salt solution, 3 pints of which, with 1 ounce of brandy, were introduced into the median basilic vein. The condition improved, but one week later a pint of blood was removed from the median basilic vein, and three pints of normal salt solution and one ounce of brandy introduced. From this time his recovery was uninterrupted.

H. Eulenstein[1] reports a case of hemorrhage from erosion of the lateral sinus. The sinus was exposed during

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(1) Archives of Otology, October, 1903.

an operation for mastoid abscess, but the hemorrhage occurred eleven days later. The hemorrhage was controlled by pressure until pyemia developed, when the jugular was ligated. The sinus was exposed farther back and hemorrhage controlled by pressure in this locality. Recovery. Eulenstein reports seventeen other cases of hemorrhage from erosion.

Bezold[1] reports three cases of *sepsis due to suppurative ear disease.* One of the cases recovered, one died of meningitis and one of thrombophlebitis. Each of the cases had a central perforation of the drum membrane and showed comparatively slight pathologic changes in the middle-ear.

The case of thrombophlebitis entered the hospital four days after the beginning of an acute exacerbation of a chronic suppuration. She had some elevation of temperature and showed mental hebetude. Two days later an exudate appeared upon both tonsils. The temperature rose to 40° C. the somnolence increased and she vomited frequently during the day. The skin was hypersensitive and the mastoid painful on pressure. There was incontinence of urine and feces.

The antrum was opened and, with the exception of a small yellowish white fibrinous deposit on the posterior wall, was normal. Cultures of the streptococcus pyogenes were obtained from the exudate. For several days following the operation the mental condition improved, but no change was noted in the fever, the vomiting or the hypersensitive condition. The pulse had always been rapid.

Four days later delirium set in. There were traces of albumin in the urine, and considerable enlargement of the spleen was made out. The next day the sputum was streaked with blood, and dullness was elicited on percussion over the region of the right scapula. Two days later dullness could also be detected on the left side posteriorly, and there was bronchial breathing. Death followed during the night. The temperature remained high up to the time of death.

The autopsy revealed interesting conditions. There was a thrombophlebitis of the left internal jugular vein, fresh emboli of pus in both lungs, fibrinous pleuritis and some

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(1) Archives of Otology, October, 1903.

enlargement of the spleen. A post-mortem diagnosis of septicemia was made. The sigmoid sinus contained liquid blood, but in the bulb of the jugular a considerable thrombus was found. It extended slightly downward, tapering to a point in the jugular. The wall of the vein was normal and was separated from the clot by a column of blood. The petrosal sinuses were empty. Incision of the bulb from behind and internally showed that the clot was adherent to the vessel wall by a small area. A small projection of the thrombus extended into the emissary vein. The walls of the veins, with the exception of a very small hyperemic area in the bulb, were normal. The drum membrane was thickened and presented a kidney shaped perforation in its lower half. The removal of the tegmen showed that the mastoid cells were normal everywhere except in the immediate neighborhood of the antrum, where they were congested. There was a small fibrinous exudate on the posterior wall of the antrum, and a very thin layer of pus on the floor of the aditus ad antrum. The tympanic cavity also appeared normal, with the exception of one small area in the vicinity of the ligamentum malleus superior, which was hyperemic.

This case presents features of unusual interest. The rapid course, terminating fatally fourteen days after the first pain in the ear, the disparity between the anatomic changes in the middle ear, and the rapidly developing and fatal thrombophlebitis all stamped it as an exceptional case.

INTERNAL EAR.

In discussing the development of the *residual hearing power of the deaf,* J. K. Love[1] recalls the following *points in the anatomy of the cochlea:*

1. That the lamina spiralis ossea is widest at the lowest turn of the cochlea, and gradually narrows toward the apex.
2. That as a consequence of the extension of the lamina spiralis across the cochlear tube the basilar membrane is

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(1) Jour. of Laryn., Rhin., Otol., August, 1903.

narrowest at the lowest turn, and gradually widens toward the apex.

3. The span of the arches of Corti widens from below upward like the basilar membrane on which they stand, but not to such a great extent.

4. High notes are probably appreciated in the lower section of the cochlea near the drum cavity, where the basilar membrane and the arches of Corti are narrowest, and low notes near the apex, where the membrane is widest—a middle section dealing with tones of such moderate pitch as are used in speech.

In looking up the literature of deaf-mutism, Love has found no case in which autopsy has revealed the presence of a perfect internal ear. The commonest findings are: Absence of the cochlea, destruction of part of the cochlea and preservation of some other part, atrophy of the auditory nerve or of its branch, the cochlear nerve, etc.

The question we must ever keep before us is this: If the auditory nerve or its expansion in the internal ear is destroyed, what chance have we to make the deaf hear? No stimulus will be of use in the absence of proper nerve-endings. It is only in the degree or to the extent to which this nervous apparatus exists that there is any chance of improving hearing at all.

When carefully tested throughout the gamut of sound, sometimes deaf-mutes show hearing for a few notes, with deafness above and below these notes—an island of hearing in a sea of deafness. Post-mortem examination shows in the case of some deaf-mutes destruction of parts of the cochlea and preservation of other parts. Taking the position of residual hearing in the tone scale, unless its location corresponds with the tones of human speech it is useless in teaching. There may be hearing elsewhere in the scale, discoverable by special tests, but it is of no practical importance.

It is important that the residual hearing and speech of every child should be made use of, and only where acoustic and oral methods have been shown to be insufficient should these be supplemented by the other methods in the education of the semi-deaf. The regular exercise of the residual hearing is the important thing, and often this can be done without tube or trumpet of any kind. The best aids to hearing are either collectors of sound or resonators which do not reinforce the sound too much. Many teachers hold that the improvement which takes place by these regular appeals to the auditory nerves is not real improvement in hearing, but only greater appreciation of sounds already heard. This seems to be a distinction which is hardly worth making, for the result is the same—the acquisition of the power to understand sounds hitherto without meaning.

Pigment Cells in Cochlea. In examining microscopically the cochlea of a woman, 40 years of age, who had died of cancer, G. S. Dixon[1] found a considerable number of pigment cells. The specimen was prepared by decalcifying by means of nitric acid and salt solution, as recommended by Politzer. The specimen was embedded in celloidin, sectioned horizontally, and was stained with Delafield's hematoxylin.

The cochlear capsule was dense bone. The modiolus and lamina spiralis were spongy and thinner than usual. The modiolus principally at the base of lamina spiralis, above Rosenthal's canal, presented large numbers of brown, iron-free, pigmented cells, irregular in form, with long processes and a clear nucleus where it could be made out. They resembled the branched pigmented cells of the choroid and iris.

The cells spread out through the thin lamina spiralis as far as the crest, thence along Reissner's membrane to the stria vascularis, where the cells proper ceased and the pigment became granular. It was then continued along the membrana basilaris as far inward as the external supporting cells. No pigment was present in Corti's organ, in the crest or capsule, and very little in the ligamentum spirale.

Since making this discovery, Dixon has examined many human cochleæ and has been able to demonstrate the presence of similar pigment cells in all.

T. R. Pooley[2] *classifies diseases affecting the internal ears* as follows: 1. Cerebral anemia and hyperemia, seldom causing serious ear changes. 2. Hemorrhagic pachymeningitis. 3. Cerebro-spinal meningitis, which is given as the most common cause of acquired deaf-mutism. 4.

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(1) New York Med. Jour., Aug. 29, 1903.
(2) Medical News, Jan. 29, 1903.

Cerebral vascular lesions which may involve the auditory centers. 5. Tumors of the brain in which hearing is affected in one-thirteenth of all cases. 6. Syphilitic growths. 7. Spinal-cord diseases which occasionally give rise to disorders of hearing. The affections of the inner ear attend more or less frequently upon the acute infectious diseases, diphtheria, scarlatina, and measles. Cases of unilateral and bilateral deafness following these diseases are reported. Influenza also has a tendency to involve the inner ear. The occurrence of ear affections in parotitis has recently received attention. Aural complications in connection with typhoid, typhus fever, and variola are referred to and cases are cited illustrating the particular affections which complicate these diseases. In hemorrhagic smallpox the labyrinth is sometimes affected. In considering the subject of inner-ear disease in malaria it is a question as to how much these affections are due to the use of quinin, as this drug has a decided action on the auditory nerves. Syphilitic affections of the labyrinth may be due to both acquired and hereditary syphilis, far more frequently to the latter. They may occur coincidently with the eruption or not till many years after, and may also coexist with middle-ear disease of catarrhal origin, this is specially true of the hereditary form. It is the unanimous observation of many authors that in the course of syphilitic affections the development of disturbance of hearing is very rapid. Syphilitic affections formerly ascribed to scrofula are dwelt upon in detail and many authorities cited. The prognosis for hearing in acquired syphilis is better than in the hereditary form. Cases of affections of the inner ear have also been observed in acute and chronic Bright's disease. Uterine disease, hysteria, and some nervous affections are briefly referred to as causing disturbance of hearing.

Roosa(1) reports a case of *disease of the auditory nerves*, causing profound deafness, accompanied at a later stage by pleuritic effusion and fibroid phthisis. The case was published in 1888 as one of deafness due to quinin. The deafness reached such a degree that it was necessary to use the conversation tube. The general health became very much impaired. In 1898 the patient again came under

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(1) Medical Record, Jan. 31, 1903.

Dr. Roosa's care. After a general course of treatment his health improved and hearing in each ear became normal. The normal hearing continued at least two years.

J. M. Bradley[1] reports a case of *typical Ménière's disease* of two years' standing, treated by carefully regulated doses of quinin. The object was to keep close to the limit without producing cinchonism.

To do this the quinin was given in solution, at first making a strength of 3½ grains to the drachm, to be taken 2 drachms in the morning, 2 drachms at noon, and 3 drachms at night.

Starting Jan. 6th with 21 grains in twenty-four hours, it was found that by increasing to 24 grains and keeping at that point for one month the spells were thoroughly controlled. Now as the administration of the drug must be kept up for an indefinite time, it was thought advisable after one month to reduce the amount given in twenty-four hours to just as little as would control the paroxysms.

The strength of the solution was then reduced to three grains to the drachm, taking one drachm in the morning, two drachms at noon, and three drachms at night, making 18 grains in twenty-four hours, without the recurrence of paroxysms of vertigo. After ten days the dose was reduced to 15 grains in twenty-four hours, without return of the spells.

The patient was now feeling better than he had in two years, and resumed his work as a clerk. An attempt was again made to reduce the dose on March 2, giving two grains to the drachm, one drachm in the morning, two drachms at noon, and three drachms at night, which was found to be insufficient to control the spells, one spell coming on the 3d of March and lasting one hour.

On the 4th the dose was again increased to 14 grains in the twenty-four hours, with no spells. After one week the dose was again reduced to 12 grains in twenty-four hours, which thoroughly controlled the paroxysms up to date. This dose, being as small as may be given without a probable recurrence of the spells, and still not large enough to cause an aural congestion, will be the permanent dose, and the patient will be required to take that amount, and in the way described above, for an indefinite time.

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(1) **Therapeutic Gazette, Oct. 15, 1903.**

By this method of treatment the number of paroxysms was reduced from two each day to one in three months, which is a fairly satisfactory result. Quinin hydrochlorate in solution was used throughout.

T. R. Pooley[1] has collected the reports of many cases of *ear disease resulting from mumps.*

The deafness and other aural symptoms occasionally precede the local pain and swelling and must often be considered as an evidence of general infection. In most cases, however, the aural symptoms are developed either between the third and eighth days or as the disease subsides. Deafness appears suddenly and rapidly increases. It is usually accompanied or closely followed by tinnitus, giddiness, pain in the forehead or occiput and nausea. The patient staggers but there is no loss of consciousness. Pain may be altogether absent or when present, only of short duration. In some cases mumps is followed by distinct evidences of meningitis with subsequent marked unilateral deafness. Occasionally the deafness develops while the patient is suffering from metastatic orchitis, or the ear symptoms appear before the orchitis. Temperature varies; it is likely to be high, if the otitis appears at an early period. Both ears may be simultaneously or successively affected and the symptoms are not infrequently confined to one ear, the right side being said to be more prone to suffer than the left. The same difference is observed in the testicles. Examination of the membrana tympani and middle ear reveals no abnormalities.

The deafness is absolute for sounds and notes of all kinds, bone conduction being totally lost. The deafness is permanent but the other symptoms gradually disappear.

K. Wittmaack[2] has conducted a series of experiments to determine the *effect of quinin on the auditory apparatus.* He is fully convinced that the hearing disturbances produced by quinin do not depend upon changes in the middle-ear.

After examining the middle-ear and labyrinth of a number of rabbits, guinea-pigs, cats, and other animals which had received fatal doses of quinin, he found that in

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(1) Med. News, Jan. 31, 1903.
(2) Archives of Otology, Oct., 1903.

all cases where animals were killed before final convulsions occurred, there were no hemorrhages nor hyperemias.

The author believes he has discovered a specific action of quinin on the ganglion cells of the spiral ganglion. This was determined by comparing these cells in animals which had received varying doses of quinin with other control animals which had received no quinin.

The ganglion cells of the control animal presented sharply differentiated granulations on a red-stained protoplasm ground, while the cells of the quinin animals showed in a diffuse blue-stained protoplasm, a few Nissl's bodies as dark blue granules. After prolonged differentiation, when the bodies of the normal cells have lost their blue color, the ganglion cells of the quinin animals become as sharply differentiated as before in the normal animal. As the other bodily cells do not show such a tinctorial condition, these changes in the ganglion cells can be regarded as changes in the condition of the cell; in other words, a disturbed vital activity.

MISCELLANEOUS.

After discussing the *relation of the eye to the maintenance of equilibrium,* R. Panse[1] says: "The second nerve path by which we are instructed as regards the relation of our bodies in space is the vestibular branch of the eighth nerve. The terminal fibers end in the saccule of the vestibule and the semicircular canals as a thick-meshed structure surrounding the hair cells. These, supported by flask-shaped epithelial cells are so arranged that their hairs project freely into the endolymphatic cavity. A cellular mass, which usually coagulates in the fluids of investigation, rests upon these cells, and at the region of the macula utriculi and sacculi (and in the lower animals at the lagena) contains crystals of lime (otoconia, otoliths), which in certain fishes are stones of one centimetre in size. Changes in the position of the head cause pressure on and dislocation of these crystals; the nerves of the two end stations are thereby stimulated and sensation in regard to the position of the head is produced. The long axis of the macula utriculi is directed from in front, up and in, backward, down and out. The diameter is about horizontal. The long diameter of the saccule is almost vertical, or more properly, up and in to down and out. The lateral axis is antero-posterior. At its median wall there is the macula.

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[1] Archives of Otology, Dec., 1902.

The gelatinous substance on the maculæ of the three ampullæ projects directly into the cavity and produces an obstruction to the passage of the endolymph in these canals. This current is produced by the fact that the fluid, owing to its heavy consistency, does not directly follow the movements of the bony canal and of the head and is consequently displaced and pushed to the wall. This has the result that the gelatinous cupola and the nerves which surround the hair cells are stimulated and the sensation of movement is perceived.

If the movement of the head and of the semicircular canals continues somewhat longer, the power of inertness in this fluid gradually assumes the same velocity of rotation, then we experience no rotation. Should all movement be suddenly arrested, the endolymph continues in its motion and forces the cupola and its hairs in the opposite direction. A sensation opposite to the original rotation is brought about, although nothing of the kind is present. We are in error in regard to our relation in space and vertigo (labyrinthine) is produced.

To produce movement of the endolymph it is necessary that the head be moved in the plane of the canals.

We are instructed by the three different planes of the semicircular canals, of which there is always one on the right and one on the left side which are parallel, in regard to motions in three different directions.

The following points are given as characteristic of disturbances of equilibrium due to ear disease:

1. The disturbance is present with closed eyes in the absence of ataxia or paresthesia.

2. With open eyes the rapid movements never reach their normal promptness or correctness and are usually hesitating and slow.

3. The disturbances are present in certain positions and in certain directions.

4. They are not equally distributed to both lower ex-

tremities; for instance, the patient can stand on the right leg, but not on the left.

5. The disturbances of movement are polymorphous.

6. Rapid fatigue on motion, especially with closed eyes. A part of the so-called muscular sense is probably nothing else than inconscious sensation which continually emanates from the labyrinth to the muscles.

7. The reaction on the goniometer, the level of which is gradually made oblique.

8. Simultaneously existing diminished hearing and other aural troubles.

9. Tinnitus without diminished hearing.

10. Nasal affections.

11. Attacks of vertigo following lesions of the nerves or of the eyes.

12. On falling, the patient remains perfectly conscious though he may be at times slightly dazed.

B. A. Randall[1] thinks *vertigo from aural lesion* is rarely due to pathology of the middle-ear. While some cases improve for a time under treatment of the tympanum, he thinks the real trouble is still in the labyrinth. He recommends that in all cases of vertigo coming to the otologist he should employ minute methods of study as to the tympanic and labyrinthine condition, but also investigate personally or through the aid of a judicious physician, all the general aspects of his patient's case.. He should exclude or relieve all involvements of the accessory nasal cavities, investigate the refraction and muscular relations of the eyes, as well as secure any information that may be given him by the eye-grounds and, abating nothing of the local treatment by inflation and massage, which the aural condition may seem to demand and using strychnia and other tonics according to the general needs of the patient, he may yet employ as a direct and almost specific means of treatment the vigorous vascular tonic, which has been given us in adrenal extract.

Kate W. Baldwin[2] thinks that the *teeth are a much more fruitful source of ear trouble* than is generally supposed.

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(1) Jour. Am. Med. Assoc., Feb. 28, 1903.
(2) Jour. Am. Med. Assoc., Jan. 31, 1903.

As a practical proof of the clinical relation between the ears and the teeth a number of cases are reported:

Case 1—22 years old. Both ears had been aching for four days, toothache several weeks. Gums hard and greatly congested over third molars, other teeth in fine condition, gums were freely lanced, a cathartic given. The patient slept quietly all night and had no more trouble.

Case 2—Patient four years in getting the four wisdom teeth. During this time had no toothache, but frequent attacks of earache, which were always immediately relieved by a free incision of the gums.

Case 3—The eruption of the wisdom teeth extended over six years. About every three months patient had earache, no pain in teeth, earache always relieved by lancing the gums. Earache from impacted third molars, more frequently caused by the upper ones.

Case 4—Patient 22 years old. Had facial neuralgia and earache, not relieved by general treatment, referred to dentist. Roots of left superior first molar in position (the tooth was extracted six years previous), inferior second molar, pulp exposed. Roots were extracted, second molar treated and filled. Two weeks later patient reported having been perfectly free from both neuralgia and earache.

Case 5—Patient 33 years old. Had had frequent earaches for one year, severe for two days, had prevented sleep. Left external auditory canal and membrana tympani much congested, teeth in good condition, except lower second molar, which had no cavity, but a white chalky appearance. As it gave no trouble, the patient refused to go to the dentist. Coal tar products controlled the pain, atropin and laxative for three days relieved the other symptoms; 11 days later patient returned with practically the same symptoms, which were relieved in four days; 20 days later returned with earache, and the tooth had been aching. She had the tooth extracted and the ear caused no further annoyance.

Case 6—Boy 12 years old. For three weeks the left ear and all the upper teeth on that side have been aching, six months previous he had fractured the left central incisor, all the other teeth in good condition. The fractured one was abscessed, the pulp was a putrescent mass. The tooth was treated and all the symptoms relieved.

T. D. Crothers[1] has conducted a series of experiments to determine the *effect of alcohol* upon the different functions of the body. These examinations were made daily for a period of ten or more days. The results were tabulated and the average of these examinations was put down as the normal equation of the man. Sometimes the experiments were carried on for a much longer period. The normal condition having been ascertained in this way, the person was given at a certain hour in the day midway between meals or after the time of eating, an ounce of ethylic spirits. Thirty minutes after, very careful examinations were made of the senses and other conditions, and these examinations were repeated every forty minutes for a period of two or three hours. The second day after, a similar quantity of alcohol was given, followed by the same measurements and tabulation of all the symptoms following. This was continued every day or every second day, according to the susceptibility of the person, until ten or more examinations were made, the person in the meantime living with great regularity, both in exercise, diet and sleep.

On the effect of alcohol upon the hearing he says:

The sense of hearing was markedly diminished. In health, where the sound of a watch could be heard clearly at thirty or forty inches from the ear, this distance was lessened in half an hour or more after spirits had been used. The watch must be moved to ten or fifteen inches from the ear to be heard. Thus the sense of hearing was diminished from a third to a half. Certain sounds could not be distinguished. Certain tones were confused or lost altogether. Musical sounds were greatly disturbed and confused. Extreme states of these palsies are commonly seen in the intoxicated man whose voice is always several keys higher than natural, simply because he is deaf and cannot hear his own voice except by speaking in a higher key. Even the moderate drinker shows a failure of hearing in the changed tone of voice.

In injuries to the head Stenger[2] finds that the *results of functional hearing tests* accurately indicate the extent of the injury.

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(1) Jour. Am. Med. Assoc., Dec. 5, 1903.
(2) Berliner klin. Woch., Vol. xl, No. 1.

T. P. Emerson[1] finds a *frequent relation between disease of the sphenoid cells and diseases of the ear.* The improvement in the tinnitus, headache and hearing which followed treatment of such nasal troubles is very marked. The number of times a drop of pus was seen in the Eustachian meatus emphasizes the importance of thoroughly cleansing the post nasal space before catheterization.

V. Hammerschlag[2] offers the following *objections to the usual classification of deaf-mutism*:

1. The previous subdivision into congenital and acquired is not grounded on pathologic or clinical differences.
2. Pronounced congenital forms of deaf-mutism may appear under the clinical picture of acquired.
3. Acquired deaf-mutism may be acquired intrauterine.
4. Endemic deaf-mutism cannot be grouped in either of these subdivisions.

Because of the action of some of the accident insurance companies in *refusing to insure persons with defective hearing,* Jas. A. Spaulding[3] has attempted to determine the relative liability to accident of those whose hearing is normal and those with defective hearing. He cites cases in which the greater sensibility to vibrations of the ground or pavement enabled persons with defective hearing to escape while others with normal hearing were injured. He concludes that:

Owing to the greater care which the deaf person takes of himself because of his very defect;

Owing to his better perception of sounds in the noise of the streets than in the case of those who can hear;

And owing to his bone-conduction, whereby he early becomes aware of approaching danger—he is as good a risk against pedestrian accidents as are those who can hear well.

[While Spaulding's conclusions may apply to those with increased bone conduction and to those who hear better in a noise it certainly would not apply to the deaf from

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(1) Laryngoscope, Jan., 1903.

(2) Arch. für Ohrenheilkunde, Vol. lvi, p. 161.

(3) Archives of Otol., August, 1903.

suppurative ear disease or lesion of the perception apparatus.—Ed.]

E. Amberg[1] thinks inflation and massage are capable of doing great harm to the ear if used injudiciously. Care should be exercised in the selection of patients for massage, and the otoscope and tuning fork used frequently during the course of the treatment. Massage may cause a loosening of the joints of the ossicles, and an abnormal flabbiness of the membrane.

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(1) American Medicine, Sept. 5, 1903.

THE NOSE AND THROAT.

INTRODUCTORY NOTE.

In preparing this department the selection of material has been almost wholly governed by the interests of the general practitioner. With the limited space at command this required that much which would be of technical interest be passed by in order to give space to the practical.

It is a pleasure to note the steady advance in scientific research in this field, and it is also a pleasure to note that a share of the best of this is being accomplished by Americans. Perhaps the most notable work of the year has been that of Dunbar in Germany on the cause and cure of hay fever.

As the work of the year is largely presented by specialists and as the specialists' work is preëminently surgical, it will be understood why most of the references given are to surgical work.

A number of worthy specialists have raised their voices in the attempt to check the tide of operative work on the nose and throat, and when one has seen some of the things that have been perpetrated in the human nose in the name of surgery he can fully sympathize with the objectors. It is well to recognize that much in the way of cure or palliation may be obtained without the shedding of blood or the use of the cautery. On the other hand, we must admit that in the respiratory tract above the larynx a very large proportion of the chronic diseases which we are called upon to treat, are due to causes which are removable only by surgery, and that it is due to surgery that the treatment of nasal disease is so much more satisfactory than it was fifteen or twenty years ago. Of course the man, who through failure to recognize the condition, attempts to cure systemic disease by destructive operative work in the nose, needs all the remonstrances that can be presented, but the man who studies his patient and is a physician before he is a surgeon is not likely to operate needlessly, neither is he likely to attempt to do with medicine what can only be done by surgery.

THE NOSE AND THROAT.

THE NOSE.

Cortical Centers for Smell and Phonation. A. Onodi[1] discusses our knowledge of these two points in physiology. Comparative anatomy and physiology as well as clinical observation throw some light upon the cortical center for olfaction, but it must be admitted that the center cannot be exactly located. The fibers of the olfactory tract can be traced to the gyrus fornicatus, the gyrus uncinatus, the internal capsule, the thalamus opticus and the temporal lobe. Pathologic anatomy and clinical observation sustain the conclusion that these parts have something to do with the sense of smell, but fail to furnish material for an exact localization. Similar conclusions are reached in regard to the center for phonation which seems to be located in the neighborhood of the Island. A peculiarity of physiologic experimentation is that it shows that the function of phonation is not abolished by the one sided extirpation of the supposed center and only temporarily by the extirpation of both hemispheres.

Regeneration of Nasal Mucous Membrane. S. Citelli[2] has investigated the method of regeneration of the nasal mucous membrane after the removal of small pieces of the superficial parts of the membrane. He finds that the alterations in the deeper structures are very slight, the glands and the erectile tissue remaining unchanged and in place of the lax tissue of the superficial mucous membrane some formation of new fibrous tissue occurs. The retraction of this scar tissue causes depression of the mucous membrane which is the source of the beneficial effect in operations upon the mucous membrane of the lower

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(1) Archiv für Laryngologie, B. xiv., H. 1.
(2) Archiv für Laryngologie, B. xiv., H. 2,

turbinated body in cases of stenosis of the nasal cavity. It is better in such case that the turbinated be not removed as the latter operation leads to too great retraction and enlargement of the cavity. The removal of small pieces of mucous membrane is the best method of operating in these cases as the pain and hemorrhage can easily be controlled by the use of cocain and adrenalin.

The galvano-cautery extends its destructive action far beyond the point that is cauterized and necessitates a longer time for healing.

Pathology. J. Wright[1], who is an indefatigable worker and is continually adding to our knowledge of conditions in the nose and throat by his studies in pathology and his reports of the same, urges the importance of microscopic study of all tissues removed from the nose in routine office and clinic work. It is of fully as much importance, he says, to examine ordinary hypertrophic and atrophic changes as to examine malignant, syphilitic or tubercular tissues.

EXTERNAL DEFORMITIES.

Paraffin Injections. Gersuny's method continues to occupy a large place in the literature. The use of paraffin injections for relief of deformities of the nose and face has become a recognized procedure and the number of cases reported has grown to such large proportions that almost every possible detail has been presented. The principal points for discussion have been the melting point of the paraffin and the accidents incident to the procedure. Some have advocated a paraffin with a very low melting point, 105° F., while others have gone to the other extreme and used that with a melting point of 135 to 139° F. Latterly the experimenters have been drawing nearer together until it can now be stated that the most generally used paraffin varies only from 108 to 112° F. Experiments by various workers have been made to determine the ultimate disposition of the paraffin. It seems to be pretty definitely settled that the paraffin of lower melting point becomes infiltrated with leucocytes and tissue cells so that it finally

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(1) American Journal Medical Sciences, June, 1903.

disappears, its place being taken by connective tissue. In the harder paraffin, encapsulation takes place to some extent and infiltration is very much slower although it ultimately occurs in all except the very hardest specimens.

A. E. Comstock[1], in his experiments on rabbits, used paraffin with melting points from 102 to 112° F. In all his cases where paraffin with a melting point of 102° F. was used, the animal died within two weeks from thrombosis. The chief danger in the use of the softer paraffins is embolism, and this danger exists in the injection of any paraffin in liquid, so that nearly all operators are now injecting the substance in a semi-solid thread. This practice requires almost of necessity a syringe with a screw piston. A number of these have been presented, but the one illustrated (Fig. 26) and known as J. W. Murphy's, has perhaps as good qualities as any. In this syringe the handle should be riveted on the piston and the piston should be distinctly marked to indicate when the plunger has expelled all of the paraffin. The quantity of material injected by American operators seems in general to be much smaller than is used by operators abroad. The former claim good results with 20 to 40 minims, while foreign operators speak of 30 to 90 minims. Nearly all

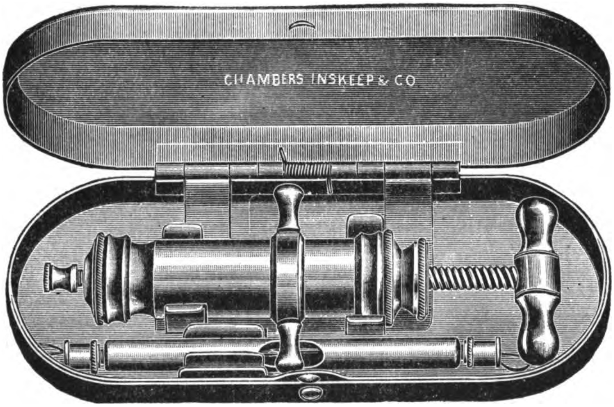

Fig. 26. Paraffin Syringe.

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[1] **Medical Record, Nov. 1, 1903.**

of the writers have given the technic which varies little in details. The following description by S. Paget[1] is fairly representative:

"Before the injection is made, everything is prepared [surgical cleansing] as for an operation. The paraffin and syringes—it is best always to have two syringes, in case one gets out of order—are kept in a water bath 6° to 7° above the melting point. A general anesthetic is given. The skin is nicked for the needle; 5 or 6 c.cm. [75 to 90 m.] of the paraffin are taken up, and the syringe is held in the water bath while the screw-nut is adjusted; then the needle is dipped for a second or two into boiling water. It should not be passed through the flame of a spirit lamp, for this method burns and stains the paraffin in it.

"An assistant keeps up very firm pressure all round the nose, making his fingers and thumbs meet in a ring, and it may help him to have a strip of soft metal under them. The needle must be put well under the skin, a little to one side of the middle line, below the point where the bridge ought to be, and directed upward. The injection should be made at or about the rate of 1 c.cm. every ten seconds. The paraffin begins to set in less than a minute, but it remains doughy for about a quarter of an hour. The moulding must be done pretty vigorously; the surgeon must not be afraid of pushing and squeezing the nose into a good shape, and he must not leave off till the paraffin is absolutely hard and unimpressionable. Then the patient is put back to bed and a cold compress is lightly laid over the face, and, as soon as he comes out of his anesthetic, a hand-glass is given to him, and he is told to look after himself and to give his nose a gentle moulding now and again during the next few hours. At one time I used to apply a Walsham's external nasal splint immediately after the injection; but I gave it up because I realized that the apparent slight settling down of the paraffin was due simply to its shrinking, which cannot be prevented.

"I come now to what I have learned not by reading but from my own cases. I have taken every case that came

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(1) British Medical Journal, Jan. 3, 1903.

to me, except one that was too trivial for treatment. I have had no disaster; but, in one case, a slight suppuration occurred, many days after the injection; and in two cases the line of puncture broke down, and gave rise to a slight discharge. In one case the patient, while still under the influence of the anesthetic, suddenly rolled over on to his face in bed and some of the paraffin was displaced. In a few cases—but only in a few—some reddening of the skin has followed the injection, and in a very few this reddening has been very slow to fade. And, of course, one gets more skilful with more experience, and able to avoid any uneven distribution of the paraffin. But the fault in those cases that have not been altogether satisfactory is not wholly mine: some of it is to be attributed to the use of Eckstein's hot and rather unmanageable paraffin, which is, I am sure now, in no way superior to a paraffin that melts 25 degrees lower.

"In two cases the nose was not only sunken but crooked, and had to be straightened before injection with a Walsham's forceps. In several of them, the septum had been destroyed more or less by caries; but these perforations of the septum have very little effect, if any, on the success of the treatment. In one, a very bad case of old syphilitic necrosis, the skin was scarred and adherent, and had to be freed with a tenotomy needle; but, unless there be this rigid and puckered cicatrix, there is no need to use the tenotomy needle; the paraffin raises the skin easily and evenly. In one or two of the cases the quantity injected was very small, not more than 1 or 2 c.cm., yet a great improvement was made. The average quantity for a badly-sunken nose is 7 or 8 c.cm., and it is better to use too little than too much.

"The general results are very good. You cannot promise to any patient a pure Greek profile, but you can promise a fairly good profile, that shall at least be straight enough to be unnoticeable. You can raise and mould the skin between the eyes, making this part of the nose quite good-looking, even though it has been, for a quarter of a century or more, absolutely flat and ape-like; and by doing this you improve the look of the eyes, and make the whole face look different, more intellectual and less stupid, more spiritual and less animal. You can, by raising the middle portion of the nose, slightly lengthen the nose, and at the same time you slightly depress the tip of it, so that the nostrils look more downward and lose their ugly forward aspect. Altogether you can accomplish a change that may fairly be called wonderful."

J. Schleifstein[1] draws the following conclusions in regard to the use of paraffin injections for cosmetic purposes:

1. Paraffin, hard as well as soft, is well fitted for prosthetic purposes and has no injurious action upon the animal organism.
2. The loss of hair noticed in animals is only occasioned when the paraffin is injected under a skin tightly stretched or is injected in too great amount so that a mechanical defect in the nutrition of the skin is produced.
3. The decubitus that has been observed at the point of injection as well as the failure of the opening made by the needle to close is to be explained in the same way; it is not dependent upon the kind of paraffin used as soft paraffin will cause it as well as hard.
4. The injected paraffin is penetrated in part by compact connective tissue in the course of time, but the action of the paraffin is not to any extent injured by this process.
5. Hard paraffin melting at 130° F., or still higher, does not cause any greater disturbance than the soft except a somewhat greater local reaction and is in man less dangerous than paraffin melting at from 97 to 108° F. in consequence of not becoming fluid in the various diseases accompanied by marked changes of temperature.
6. In places where there is danger from ill-regulated pressure upon the surrounding tissues, the hard paraffin serves a better purpose because it solidifies quicker and is less likely to cause thrombosis.
8. For cosmetic purposes paraffin should be used only in case of striking deformities and at the wish of the patient as it is not entirely incapable of doing harm.

A. E. Stein[2] advocates the use of a paraffin of melting point of about 106° F.

Accidents. These are perhaps more numerous than the journal reports would indicate. These reports are made

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(1) Archiv für Laryngologie, B. xiv., H. 3.
(2) Deutsche medizinische Wochenschrift, Sept. 10, 1903.

for the most part by men who are expert in such work and naturally they would have fewer bad results than the non-experts. Harmon Smith[1] gives the following causes of necrosis: (1) Surgical uncleanliness; (2) too much pressure, cutting off blood supply to the part; (3) injection into the skin and not beneath it; (4) constitutional disease of patient, as diabetes or Bright's disease. Of *hyperinjection* he says: "Hyperinjection may be avoided by the use of a syringe where absolute control of every minim is under the guidance of the operator, and by a little conservatism in attempting to correct the entire deformity at one sitting. The *misplacement* or lodgment in neighboring parts not intended for the injection, is again the result of a piston syringe, where the needle becomes plugged with paraffin harder than that in the syringe, and on exerting more force this is violently ejected and followed by a volume of liquid paraffin which shoots everywhere beneath the skin and is beyond the control of the assistant or any mechanical device. The most humiliating result is one from hyperinjection or misplacement. The chemical agent that will dissolve out an overplus of paraffin through the skin is not yet within our ken. I have not only been consulted by many unfortunates from other operators' hands, but had a similar result from the use of an aspirating syringe in one of my own cases. An attempt to curette this overplus away through a subcutaneous opening was far from successful. Since then I have obtained better results by cutting away the loose tissue in which the paraffin was imbedded. In one case sent me for correction this method was entirely satisfactory. Here the paraffin had even extended into the soft tissues of the upper eyelid, and its removal occasioned considerable tumefaction, lasting some days. I have never observed any absorption to have taken place in any of my cases, and it has now been two years since the first were begun."

L. M. Hurd reported to the Section on Laryngology and Rhinology of the New York Academy of Medicine on May 27 a case in which there had been *instant loss of vision* following a paraffin injection for nasal deformity. The patient was a man of thirty-three years without any history of syphilis, whom he had given, some months previously, two or three injections of paraffin with the object of improving a nasal deformity. The man returned requesting another injection, and while this was being given he became blind. Ophthalmoscopic examination revealed the typical appearance produced by embolism of the central artery of the retina. While the possibility of this accident being a mere coincidence was freely admitted, the opinion seemed to prevail that it was directly connected with the paraffin injection. The blindness is permanent.

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(1) Journal American Medical Assoc'n, Sept. 26, 1903.

NASAL SEPTUM.

Perforation. J. Bamberger[1] agrees with Poincarés in the explanation of the fact that workers in chromium compounds suffer from a perforating ulcer affecting the septum of the nose by saying that it is due to a deflection of the inspired air by the sides of the nostril to the septum which thus receives and retains the bulk of the caustic contained in the air.

Abscess. The treatment of abscess of the septum with a view to preventing subsequent deformity is discussed by C. G. Coakley[2]. As the cartilage of the septum receives its nutrition from the mucous membrane, the latter serving as a perichondrium, it is not surprising that the cartilage rapidly melts away when pus lifts the mucous membrane from it on both sides. Five or six days is quite sufficient time to accomplish the destruction of a large portion of the cartilage. Keeping this fact in mind one appreciates how very necessary it is to evacuate an abscess of the septum at the earliest possible moment. In order to avoid the deformity so often following these abscesses Coakley pursues the folowing method: Make an incision ¾ to 1 inch in length on the side which seems softest and as far forward as possible. Irrigate the abscess cavity with carbolic solution, 1-100. Spray the nasal cavities with a 4 per cent solution of cocain containing a little adrenalin chlorid. Five minutes later make pressure from behind forward with a cotton-wound

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(1) Muenchener medicinische Wochenschrift, Dec. 23, 1902.
(2) Laryngoscope, March, 1903.

probe to completely empty the abscess cavity. Next, irrigate the nasal passages with Dobell's solution and insert a Simpson tampon into each naris, the tampon on the side which bears the incision should have its anterior edge just posterior to the line of incision. Tampons are to be removed and fresh ones inserted daily for a week. After that the Kyle non-perforated splint takes the place of the tampon and is worn for three weeks.

Deformities. The question of the proper operation for deflected septum is still a matter of much discussion. Many different methods have been presented, all having some points of value. The gain from the investigations thus far has been the established conviction in the minds of specialists that there are a great many ways to accomplish the desired end, and that while one kind of operation might be adopted in every case, yet brains count for something in this kind of work the same as in any other, and it is better to study each case and use the method best adapted to the individual case. Some very pretty operations have been described from which the originators claimed great success, yet one thoroughly familiar with the mechanics of such cases and the structure of the septum must at once conclude that either the cases reported must have been very peculiarly adapted to the particular operation or else the operator had an extraordinary streak of luck. Some things are nicer to read about than to try on your patients.

The Asch operation continues the standby for most operators in cases involving only the cartilaginous septum, and also in other cases in combination with a suitable operation on the bony septum.

Emil Mayer[1] is the chief exponent of the Asch operation. His experience now extends to some hundreds of cases and great weight should attach to his opinion "that the vast majority of deviations may be successfully cured by this method." He urges that the operation be done always under a general anesthetic and followed by rest in bed for three days.

B. Douglass[2], as the result of numerous cadaver experi-

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(1) Journal Am. Med. Assoc., March 7, 1903.
(2) Laryngoscope, April, 1903.

ments, concludes that the common belief that the triangular cartilage may be broken into several fragments enclosed in a layer of mucous membrane by the use of the septum forceps is fallacious. He has not found the cartilage broken or twisted by the forceps in any way nor the resiliency diminished. The apparent breaking up and loss of resiliency is, in fact, due to a breaking loose of the cartilage from one or more of its bony attachments. When sections of the fractured septum are made some time after healing, it is not found that there has been any attempt at the production of new cartilaginous tissue. On the other hand, the displaced fragments of the cartilaginous plates remain separated and their fractured edges may be readily made out. Between these fractured edges, as well as in the immediate neighborhood, the new connective tissue has been formed uniting the fragments. Further examination of the adjoining perichondrium shows that it has been thickened and that this thickening extends into the submucous tissue of the septal mucous membrane in such a way that this new connective tissue is pressed out between, around and at a considerable distance from the broken edges so as to form a series of fibrous adhesions or a single large adhesion, which is one of the most active factors in keeping the septum displaced and in reproducing the displacement after a corrective operation. The only way to deal with these fibrous bands is by an incision or incisions made in such a way as to divide a number of fibrous bands. Such incisions should be made along the entire length of the triangular cartilage and parallel to the nasal floor. As the septum crushing forceps are useless except incidentally or accidentally by separating the cartilage from its attachments it is better to avoid their use and possible dangers of necrosis and accomplish the separation of the bony attachments directly and much more exactly. Douglass believes that there is little danger from fracturing the bony septum if it be not grasped too high and if strict antisepsis is observed. In making incisions through the cartilage it is much better to make them parallel instead of crucial if more than one is needed. Better results are obtained and the danger of necrosis is less. The author believes that his greatest success in septum operations has been determined by the recognition of the part played by the superior maxillary spine. This spine is formed at the junction of the two maxillæ, the ridge extending from the palatal process forward to the anterior edge, where it becomes thicker and higher and quite pointed. The spine receives anteriorly the triangular cartilage and posteriorly the vomer. He has found that if he completely severs this spine it is often unnecessary either to incise the cartilage or to break the septum from the ethmoid. The operation is done as follows:

Through the upper lip. Inject five drops of a 2 per cent cocain solution to which adrenalin is added, into each side of the raphe of the upper lip. Inject three or four drops in the nose at the point of junction of the skin and mucous membrane. If the entire septum is to be dealt with a stronger solution of cocain should be applied to it on cotton pledgets. The lip is now raised and an incision is made on one side of the raphe sufficient to admit a chisel 2-10 inch wide, to the spine. With a finger in the nostril to determine the position of the chisel and the spine the chisel is forced gently through the bone by light blows. If carefully done, the mucous membrane in the floor of the nose is not broken through. Stitches are seldom necessary in the labial wound. If the septum is not rendered free enough the vomer may be fractured from its attachment by the forceps or by the chisel. The chiseling loose of the spine may be done through the nose instead of the lip by making the incision along the base of the septum. Some form of splint must be worn for from five to fifteen days, but the period is much shorter than where only the usual incision through the cartilage is made. Douglass prefers the Bernay's sponge of compressed cotton, cut into narrow strips and packed in both nostrils, about twice as much on the convex as on the concave side.

M. H. Cryer[1] states that about 65 per cent of the large number of skulls which he has examined had straight septa. He thinks that rhinologists are likely to over-estimate the proportion of people having crooked or deflected septa because those having straight septa seldom have occasion to consult the rhinologist.

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(1) Laryngoscope, December, 1902.

THE TURBINATED BODIES.

Hypertrophic Rhinitis. E. L. Shurly[1] places first as an etiologic factor in this condition the lack of proper development of the nasal passages, due to evolutionary or devolutionary changes in the relation of the face to the brain cavity. Next to this he names the exanthemata and diphtheria as the causes of catarrhal conditions. The unhealthy conditions of living among civilized people render healthy nasal mucous membranes almost impossible.

Jacob E. Schadle[2] believes that a cure of hypertrophic rhinitis is not possible by other than surgical means. In the intumescent forms—false hypertrophies—he favors the use of chromic acid. A special applicator as shown in Fig. 27 is used. He uses this applicator in treating hypertrophic conditions of the middle turbinal, making the application by the aid of the post-rhinoscopic mirror, the palate being controlled by a soft retractor. Schadle favors the judicious use of the galvanocautery in the reduction of genuine hypertrophies of the inferior turbinate and soft hypertrophies of the septum. For posterior hypertrophies he uses the cold snare. He expresses a hearty contempt for the "spoke-shave" method for removal of hypertrophies, a feeling which is shared by the Editor.

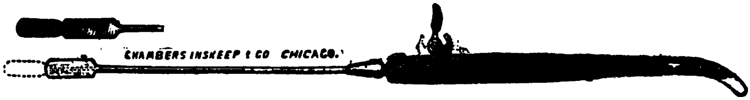

Fig. 27. Schadle's Chromic Acid Applicator.

The subject of untoward results after partial or complete turbinectomy was discussed by H. Pegler[3] at a meeting of the British Laryngological, Rhinological and Otological Association. As illustrating the conditions sometimes arising after operations on the inferior turbinal he gave the following interesting experience: "In the winter of 1901 I was called upon to clear up a case of very pronounced nasal

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(1) Laryngoscope, May, 1903.
(2) International Medical Magazine, Feb., 1903.
(3) Laryngoscope, August, 1903.

obstruction, due to œdematous polypoid hypertrophy of both inferior turbinals, in a gentleman aged 30. He was a man of fine physique, having large features generally, and a large, well-proportioned nose. The obstruction, I would emphasize, was almost entirely created by redundant *mucous membrane,* though on the left side—that on which I shall be almost exclusively concerned with in this paper—a crest on the septum, thick and prominent anteriorly, and in contact with the turbinal tissues, considerably augmented it. The fossæ proper were roomy, so that whilst it was imperative to radically treat the distressing catarrhal symptoms of which the patient complained, it was equally necessary to avoid the risk of after-trouble, arising from crusting of the secretions, by not taking more tissue away than was absolutely necessary, especially the bony frame-work, for here was a case in which the widening out of the posterior third of the meatus was unusually well marked.

"In February, 1901, in the presence of the patient's medical attendant, I removed from the front with shears and snare the anterior third of the left inferior turbinal; then, behind, this, two lobulated masses, including little bone, if any, with the snare alone, leaving the posterior extremity intact. It remained now to level the septal wall and the space was clear. The chief point to note in the course of the healing stage is that by the middle of April following, stagnation of mucus in the outer wall of the inferior meatus posteriorly was requiring careful attention, and that I thought, on the whole, it would be better to reduce the end part of the valve-like pendulous extremity of the inferior turbinal, which flapped backward and forward with the breath current. This can, at least, have done no harm, for by the end of June a healthy condition was established, and I saw the patient no more for the time being. This state of things, however, was not destined to last. In December, 1902, eighteen months later, the patient returned complaining of the following symptoms: Abundant crust formation and expulsion, together with bleeding from the left nasal cavity, a handkerchief being soiled with crusts and blood stains in a short space of time; sticky crusts adhering to the back of the throat, and frequently coughed up; voice failure after any continued use, and so forth.

"Being a man of means, with a good deal of time on his hands, he had led the usual out-or-door life, hunting and driving about, but he had neglected to use his syringe systematically for a considerable interval, the cleansing of his nasal passages having been limited to the doubtful expedient of sniffing up warm saline solution from a basin. Upon examination, after cleansing away the large green crust masses that obscured everything in the left fossa, a peculiar appearance was seen. The bulbous posterior end of the inferior turbinal, and the contiguous portion of the ridge or stump for about an inch in the widest part of the meatus, was of an ash-gray color and ulcerated, or, at all events, raw and bleeding, on their meatal aspect.

"When palpated with a probe no bare bone was felt, but blood dripped freely from the whole extent of the surface, and it was exquisitively sensitive to the touch. Both middle turbinals had become slightly œdematous; the posterior wall of the pharynx was glazed over, and sticky greenish crusts were adhering in patches. The treatment I adopted for this unaccountable condition in the left fossa was as follows: A system of frequent and voluminous douchings with warm detergent solutions was instituted, commencing on December 1, when, under cocain, the galvano-cautery, with a flat burner, was freely applied to the whole of the ulcerated part. A mixture of iron and arsenic was prescribed internally. Between this date and December 31 the galvano-cautery was applied once more—strong solution of sulphate of copper once, and chromic acid fused upon a specially large and flat copper applicator three times. At most of the sittings large green crusts were found lodged in the recess; and though the general condition slowly improved, bleeding was still rather free from the diseased surface. On December 31 I determined to try the effects of iodine locally, and began by an application of the following pigment after thorough and careful cleansing: Iodi pulv., grs. 15; pot, iodidi, grs. 60; ol. menth, pip., M v.; glycerini, ad. fl. 3i. This caused no inconvenience beyond some smarting, but seemed to have a beneficial effect. The patient was then taught to apply a weaker solution of Mandl's pigment to the interior of the chamber by means of cotton-wool on a probe, after syringing, and he was instructed to continue this twice a day for some time. In the meanwhile he was sent to Margate for the sea air. He soon wrote a good report of himself, and when examined on January 24, 1903, the ulcerated part was quite covered with healthy pink mucous membrane, and all crusting had disappeared. I may here observe that in the right nasal chamber much the same radical procedure was carried out in the first instance; but although a great deal more tissue was snared off, including the posterior end of the inferior turbinal—as much as could be secured—it was quite a difficult matter to clear the breath-way. Cauterization of the mucous cushion of the septum helped somewhat, but re-growth of the turbinal tissues was rapid, so that twice subsequently the snare and cautery have been required, yet no crusting or other trouble of that kind has ever arisen. I am inclined to attribute this to a slightly different conformation of the superior maxilla on the right side, with less hollowing out of its meatal wall. As regards the healing of the ulceration on the left side, thorough cleansing doubtless was an essential factor; but no very striking result was apparent till after the commencement of the iodine applications, which the patient, by the help of a mirror, made accurately to the precise spot."

[While considerable space is given to the details of this case, yet it seemed to the Editor to touch on so many points of interest not usually written up that the quoting of details is justifiable.]

Atrophic Rhinitis. *Etiology.* J. Wright[1] says from his researches he quite agrees with others that there are plausible reasons for believing that the essential lesion and primary one in atrophic rhinitis is a *bone lesion* which interferes in some way with the radicle vessels which lie in bony canals, or are compressed in some way against bony plates.

Vaquier[2] describes six cases of ozena in one family and argues for the contagious character of the disease. He believes the bacillus fetidus ozænæ of Perez is the carrier of contagion. While cases of contagion are rare he believes that a child with ozena should sleep alone and every care should be taken in regard to the use and cleaning of handkerchiefs, towels, etc.

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(1) American Journal Medical Sciences, June, 1903.

(2) Arch. Internat. Laryngol., d'Otol. et de Rhinol., Dec., 1902; abst. Jour. Eye, Ear and Throat Dis., April, 1903.

L. S. Somers[1] thinks that while it is probable that various factors play an exciting rôle in the etiology of atrophic rhinitis, yet three conditions presenting strong evidences of *hereditary transmission* are seemingly concerned as an underlying foundation upon which the development of the disease is essentially based, these being (1) certain deviations from the normal in the osseous frame-work of the nasal chambers; (2) tendency towards localized epithelial metaplasia, and (3) as a possibility, the attenuated taint of syphilis or tuberculosis. That hereditary transmission plays some important part is shown by the presence of the disease in several members of the same family, often extending through two or more generations, and by the very early age at which the disease first develops. A group of cases were reported consisting of a mother with atrophic rhinitis, which developed during her seventeenth year, and her three children, in whom the disease developed at the age of four, and two years, and twelve months, respectively.

The deviations from the normal in the osseous framework of the nose, consist of an abnormal width of the fossa and an antero-posterior flattening. The epithelial metaplasia consists in the transformation of the ciliated columnar cells into the flat, squamous variety, while the inherited pathologic taint is shown by the history of tuberculosis or syphilis in a number of these cases, in the parents or grandparents of the affected individuals.

While it is not desired to take exception to the more prominent supposed etiologic factors concerned in atrophic rhinitis, as, for instance, that it is caused by a specific bacterium; by congenital atrophy of the turbinates; by malnutrition, or tropho-neurosis, or that it is the result of infantile purulent rhinitis, of hypertrophic rhinitis, or of accessory sinus suppuration; yet irrespective of whatever part these may play in the individual case, it is desired to emphasize the apparent fact that heredity plays an essential part in the vast majority of cases of this disease.

W. Freudenthal[2] believes that the *dryness of the house atmosphere* in which we live is largely responsible for ozena. The dryness brings about atrophy of the nasal interior and the invasion of Abel's bacillus develops the foul odor characteristic of ozena. Accessory sinus disease is, he believes, secondary to the nasal disease and is not as Gottstein asserts the cause of the nasal disease. Cases are cited to show that the tendency to the disease is sometimes inherited.

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(1) Virginia Med. Semi-Monthly, Nov. 27, 1903.
(2) Annals of Otology, Rhinology and Laryngology, June, 1903.

Treatment. Nothing new has been offered in the etilogy of this condition during the year and the same may be said in regard to treatment. The essential of every plan of treatment is the thorough removal of crusts. The physician who is not doing special work in this line has not done his duty by a patient in simply instructing him to use a douche and keep the nose clean. The patient should be inspected at frequent intervals to determine whether he is successful in removing *all* of the crusts, and if he is not thus successful, additional means must be ordered until the desired result is obtained. Some stimulating application such as glycerin or iodin-glycerin on a cotton pledget, or an irritating snuff, or a spray of pyrozone may be found necessary, this to be followed by the douche. For office application ichthyol-glycerin, 10 to 25 per cent, and iodin-glycerin (iodin 2 to 8 gr., pot. iod., 4 to 16 gr. to the ounce of glycerin) still remain favorites. The pledgets to be allowed to remain in the nose 15 to 30 minutes. Gottstein's method of packing with cotton-wool is very satisfactory. The cotton is packed in loosely and allowed to remain 5 to 24 hours, one side being packed at a time.

J. A. Stucky[1] summarizes the systemic treatment as intestinal, glandular, and cutaneous. Laxatives with the use of colonic flushings once or twice a week; sodium iodid to excite glandular activity; plenty of exercise with careful attention to the skin.

Locally malformations should be corrected, infected sinuses treated—surgically if necessary—and thorough cleansing done. The cleansing should be done once or twice daily by the patient. Stucky uses locally by spray, trichloracetic acid 1 or 2 per cent; chromic acid 1 per cent; or nitrate of silver 2 per cent. One of these is used twice a week by the doctor until the secretion is diminished in quantity and no longer retained in the nose.

Vaquier uses the iodin treatment with satisfaction. Twice

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(1) Internation. Medical Magazine, Feb., 1903.

a week the nose is cocainized and carefully painted with Ruault's Iodoglycerin No. 2, or a pledget of cotton is inserted in the inferior meatus, iodized ether injected into it and both nostrils tightly closed. The iodized vapor permeates the entire nares and accessory cavities. Fifteen to thirty grains of KI. are administered internally every second day.

L. S. Somers[1] records a case of severe atrophic rhinitis in a man of 38 in which a practical cure followed an attack of erysipelas of the face and nose. The case suggests to Somers the possibility of benefit from the use of Coley's fluid in ozena.

Treatment by paraffin injections. Broeckaert[2] uses a paraffin melting at 45° C. (113° F.) which has several advantages over paraffins of higher melting point. The injection can be made more slowly and the restoration of the turbinated body can be made under lower pressure. There is also less danger of phlebitis at the lower temperature, which should never rise above 55°C. The reaction of the tissue is more favorable as the paraffin being softer permits the penetration of phagocytes and the extension of a framework of connective tissue into it. The injection should be made in such a way as to restore the turbinated body from behind forward, injecting not more than 2 c. c. at one sitting. In some cases the injection may be made in the septum or in the floor of the nasal cavity, thus reducing the capacity of the nasal cavity at the will of the operator.

The results have been very favorable. The author reports two cases entirely cured of the ozena, the lower turbinated bodies having been completely restored, the mucous membrane being slightly turgescent and of a normal color. There were no crusts or thickening of the mucosa. All disagreeable odor has disappeared although douches have not been used for months. These cases were regarded as incurable, the ordinary methods of treatment having been tried for years without result. The dangers of the operation are slight. Patients sometimes complain of headaches and there is sometimes edema of the cheek. Phlebitis has been less common in the author's recent cases than at first.

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(1) Medical News, August 29, 1903.
(2) Annales des Maladies de l'oreille et du larynx.

The action of the paraffin appears to be, first, mechanical by reducing the size of the nasal cavity and allowing less space for the accumulation of putrefying secretions. Secondly, the paraffin stimulates the mucous membrane, causing a regeneration of its elements. The paraffin becomes permeated with young cells among which typical giant cells may be noticed; the epithelium especially takes part in this regeneration and the degenerated glands so numerous in the atrophic mucous membrane become very rare or disappear altogether. The cavernous tissue also participates and assists by increase of tissues in the contraction of the cavity. It is probable that by the hyperplasia of the tissue the glands are compressed and disappear, which explains the absence of a secretion with nauseous odor. The author believes that the time is near when we may announce the curability of ozena.

Complications. T. Hubbard[1] reports three fatal cases of *meningitis* in which the source of infection appeared to be the nose. In two, autopsy seemed to prove the supposition and in the third the clinical evidence was very strong. He is convinced that ozena is an important factor in the etiology of purulent mastoid disease and meningeal infections.

A. Alexander[2] concludes as a result of a painstaking investigation that the occurrence of *ozena predisposes to the occurrence of tuberculosis of the lungs.* He bases his conclusions upon the results in 200 cases of phthisis investigated to determine the frequency of tuberculosis. Previous investigators have given little attention to this question. The autopsy findings in cases of ozena indicate a strong tendency for such patients to die from tuberculosis. Of 22 cases in which an autopsy was made the presence of phthisis was established in 15 and in most cases as the cause of death, in some as an accidental finding. Clinically the predisposition has not been generally recognized. Clark found in 73 per cent of 100 phthisical patients some degree of atrophy of the nasal mucous membrane. J. K. Hamilton investigated 170 cases of chronic fetid rhinitis but could find only six cases of phthisis among them. E.

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(1) Laryngoscope, September, 1903.
(2) Archiv f. Laryngologie, B. xiv., H. 1.

F. Ingals concluded from an investigation of 14,953 cases of disease of the nose that nasal catarrh does not predispose to tuberculosis of the lungs. Perhaps an exception might be made in favor of ozena.

Among 200 phthisical patients the author found 31 in whom there was atrophy of the nasal mucous membrane. Of these 1 was an undoubted case of ozena, 6 gave a history which made it probable that they had previously suffered from ozena, 9 had extensive atrophy in which this assumption was not admissible, while 11 were due to phthisis. None of the patients except one complained of excessive secretion or showed fetor of the discharges. The author suggests that phthisis exercises an influence upon the nasal secretion which brings about a suppression of the fetid discharge and causes a cure of the ozena in the clinical sense. From the examination of fifty ozena patients it was found that 22 were suffering from tuberculosis of the lungs, 7 were suspicious cases, 4 were affected with other lung diseases, and 17 had no disease of the lungs. The conclusion is that ozena predisposes to tuberculosis, which the author explains as the result of the suppression of the natural cleansing secretion which is a poor culture medium and the substitution of a thick secretion which forms a good culture medium and prevents the nasal mucous membrane from fulfilling its function of warming and moistening the inspired air. More work is thrown upon the lungs and frequently the inflammation spreads from the nose to the lungs rendering them less able to resist the invasion of tubercle bacilli.

Synechiæ. E. von Navratil[1] introduces a new method of treatment for nasal synechiæ. The patient, a girl of fifteen, suffered from entire closure of the left nostril and almost complete of the right as a result of syphilitic disease. The occluding tissue was removed and scar tissue incised. On the wounded surface a Thiersch flap from the thigh was placed and held in place by sutures at the edge and by very slight pressure. The result was very good.

Polypi. The literature of the year shows a decided growth of the opinion that in all cases of recurring polypi

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(1) Archiv f. Laryngologie u. Rhinologie, B. 14, H. 3, 1903.

of the upper nasal passages the middle turbinal at least should be removed and in many cases the ethmoid cells destroyed. As repeated operations are very unpleasant to the patient and are much dreaded so that considerable obstruction is allowed to occur before presenting again for operation; and as cases have been reported in which the long continued irritation of the polyps and repeated operations have been followed by malignant growths (the etiology of latter being at least uncertain), it would certainly seem to be our duty to give our patients the benefit of the radical operation. This is, of course, a matter for individual judgment in each case.

C. H. Baker[1] advocates this method and gives a number of cases illustrating its value. He removes the turbinal with scissors and snare. O. T. Freer has found a sharp heart-shaped spoke-shave a very satisfactory instrument for removal of this bone. E. Pynchon uses a guarded trephine, finishing with the snare. E. M. Holmes[2] removes the middle turbinal and curettes the ethmoid in obstinate cases with good results.

F. R. Packard[3] discusses the *etiology* of nasal polypi. He believes that these are not real growths, but only symptoms of underlying conditions. The microscope shows no trace of myxoma but only a mucoid degeneration. Simple removal of polypi does not reach the disease, but is removal of a symptom only. Removal of the diseased tissue is necessary in order to prevent recurrence of the polypi. He says, "When rhinologists have learned that nasal polypi are symptoms of underlying conditions, and not 'tumors,' the mere removal of which will result in a complete cure, it will redound greatly, not only to the credit of the profession, but to the benefit of the patient, by lessening, if not altogether abolishing, the frequent recurrence of polypi after their removal by operation." He believes that in most cases removal of a large part of the middle turbinal is necessary for cure. Luc[4], while calling the growths *myxomas,* advocates the same method of cure. He removes

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(1) Journal Am. Med. Assoc., March 14, 1903.
(2) Boston Medical and Surgical Journal, March 26, 1903.
(3) American Journal Medical Sciences, Nov., 1903.
(4) Annals of Otol., Rhinol. and Laryngol., Sept., 1903.

the entire middle turbinal and ethmoid cells with a pair of forceps, having discarded the curette.

J. P. Clark[1] presents a study of 147 cases of nasal polypi. After removal with the cold snare, supplemented by cutting forceps when necessary, Clark thinks he has had good results from the use of 95 per cent alcohol applied on cotton pledgets to the site of the growths. He often prescribes distilled extract of hamamelis in a spray for the patient's use. He especially emphasizes the following points: (1) The question of a previous injury to the nose is to be considered in the etiology of polypi. (2) Probably only a small proportion of cases are caused by sinus disease (usually ethmoiditis). (3) A local vasomotor disturbance, which may be of constitutional origin, stands in a causative relation to polypi in a certain proportion of cases. (4) The removal of the whole middle turbinate will be found necessary in many cases where the growths are diffuse. (5) Many cases of nasal polypi can be cured if patients will return for treatment as instructed.

M. Hajek[2] reports a case of nasal polypus which returned after thorough extirpation. Investigation proved that it had its *origin in the maxillary sinus,* and upon opening the sinus it was found to be full of small polyps which sprang from a polypoid degeneration of the mucous membrane without any suppuration or empyema of the cavity. The author states that there are three recognized causes for the return of nasal polypi after removal, viz:

1. The imperfect removal of the tumor. 2. The deep-seated inflammation, reaching even to the marrow of the bones, which sometimes accompanies the formation of polypi, especially in the region of the labyrinth of the ethmoid. 3. The over looking of an affection of one of the accessory cavities. The case reported by the author cannot be brought under either of these categories and hence Hajek proposes another cause: the polypoid degeneration of the mucous membrane of an accessory sinus.

The case raises some interesting questions. The origin of such a polypoid degeneration is probably to be found in a catarrhal inflammation of the mucous membrane which resulted in the formation of numerous edematous swellings identical in structure with polypi which remained when other parts of the membrane returned to the normal condition. The invasion of the nasal cavity by the polypus was probably due to a temporary increase in the contents of the sinus from the presence of an increased amount of liquid in the cysts which accompanied the polypi. The presence of a croupous false-membrane indicates that the mucous membrane of the sinus is capable of producing a fibrinous exudate, contrary to the opinion expressed by Zuckerkandl. The diagnosis of the origin of the polyp from the antrum may be based upon the fact that the growth has suddenly appeared, that it can be traced into the mouth of the cavity and that lavage of the cavity causes other polypi to appear. The puncture of a cyst with the probe may give exit to a serous fluid which will aid the diagnosis if its cystic origin is recognized.

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(1) Boston Med. and Surg. Journal, July 2, 1903.
(2) Archiv für Laryngologie, B. xiv., H. 3.

Sarcoma. J. G. Connal[1] removed a sarcoma filling the entire left nasal passage from a man of 56. There was a history of several removals of polypi during the preceding three years, but not much relief had been secured. The tumor seemed to originate from the posterior end of the inferior turbinal and had grown forward and formed adhesions to all sides. The electro-cautery was used to sever the septal attachment, the mass being then removed with scissors and cold snare at several sittings. The wounds left were thoroughly cauterized. The growth was a spindle-celled sarcoma with some round cells. There was no return seven months later. Price-Brown[2] reports three cases of sarcoma of the nose removed by the electro-cautery. The patients showed no signs of recurrence after 8½ years, 9 months and a few months respectively. He advocates intranasal operation with the galvano-cautery in these cases.

Hydrorrhea. A. Laquerriere[3] reports a case of persistent nasal hydrorrhea which had resisted various forms of local treatment as well as applications of static electricity, but which was completely cured by a course of treatment with high frequency currents. The cure in the opinion of the

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(1) Glasgow Medical Journal, November, 1903.
(2) Journal Laryngol., Rhinol. and Otol., Aug., 1903.
(3) Le Progrès médical, Jan. 10, 1903.

author cannot be attributed to suggestion nor to the action of ozone upon the diseased mucous membrane, because, while ozone is given off by the apparatus for the generation of the high frequency currents it is also produced by the action of the static machine with which the patient was treated for some time without effect upon the discharge from the nose. The improvement must be attributed to the improvement in the general condition which took place in consequence of the high frequency applications.

Diphtheria. Helot[1] reports two cases of diphtheria confined to the nose, in one of which there were severe general symptoms while in the other the symptoms were entirely local. This form of diphtheria is not so rare as is believed, because it often passes unrecognized. It may occur without the production of false membranes.

The diagnosis can not be made from the symptoms as there is nothing in them to distinguish the cases from those of ordinary fibrinous rhinitis. Bacteriologic examination must be supplemented by the injection of cultures into guinea-pigs, some of whom have been immunized by diphtheria antitoxin. If the injection proves fatal to the untreated pigs, while it does not affect those which have been previously immunized, the diagnosis of diphtheria is confirmed. If these precautions are disregarded there is great danger of mistaking the pseudo-diphtheritic bacillus for the genuine bacillus of diphtheria. The recognition of nasal diphtheria is of great importance, as the bacilli even in the forms which show no clinical signs, may remain in the nose for weeks or months and may be the means of spreading the disease, as the child is very apt to eject pieces of false membrane in the act of sneezing. The false membranes in the nose may also be the occasion of serious auto-infection.

The treatment is the same as for diphtheria of the pharynx, viz., the use of antitoxin. The irrigation of the nose does not seem indispensable to the author and it may be impracticable on account of resistance by the patient.

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(1) Annales des maladies de l'oreille et du larynx, Jan., 1903.

General Septic Infection of Nasal Origin. A. L. Turner[1] describes two cases in which there were all the symptoms of general sepsis and in which the only source of infection was found to be a purulent rhinitis. The accessory cavities were not involved. Treatment directed to cleansing the nasal passages gave entire relief. Turner quotes the histories of several cases from other writers in which septicemia was due to chronic antral empyema.

Nasal Disturbances in Typhoid Fever. M. Toeplitz[2] describes two cases of nasal synechiæ in adults which he believes were caused by typhoid fever. He mentions as nasal disturbances in typhoid, dryness of the mucous membranes, abrasion of epithelium, erosion, particularly at the anterior portion of the septum, with occasional, frequently intense and dangerous bleedings. The erosion may lead to ulceration and perforation of the septum, or it may result in adhesions with the opposed surface of the lower turbinated body. Attention to the nasal passages with very gentle spraying with Dobell solution followed by a spray of albolene or benzoinol containing 3 grains of menthol to the ounce will give relief in these cases.

Nasal Vertigo. Edward Woakes[3] describes two cases in men 38 and 40 years of age respectively, in which obstruction in the nose caused vertigo closely resembling epilepsy. In one case the pressure was due to greatly enlarged middle turbinates and in the other to an exceedingly hard exostosis occupying the position of the middle turbinate. The cases are very carefully described and considered, and there seems little room to doubt the correctness of the asserted etiologic factors.

Rhinologic Treatment of Dysmenorrhea. Lautmann[4] has investigated the method of Fliess for the treatment of dysmenorrhea and partially confirms his conclusions. Fliess found that the application of a probe to the lower turbinated body in a menstruating woman was followed by pain in the hypogastrium of the corresponding side. If the tuberosity of the septum were touched

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(1) Annals of Otol., Rhinol., Laryngol., June, 1903.
(2) Medical Record.
(3) Lancet, August 16, 1902.
(4) Annales des maladies de l'oreille et du larynx, Sept., 1903.

pain was felt in the sacrum or loin. In women who suffered from dysmenorrhea relief was experienced when these points were cocainized. In view of these facts Fliess regarded the pains of dysmenorrhea as due to the irritation of these points in the nose which he called the genital points. He proposed to cure dysmenorrhea by the cauterization of the points.

Lautmann finds that these points are the source of pain in the hypogastrium in a large proportion of menstruating women and that the application of cocain to them brings relief in a large proportion of cases of dysmenorrhea: In many of these cases the possibility of suggestion must be admitted. The cauterization of the points is reported in three cases, with success in one, immediate relief in the second, although the pain finally returned, and one was lost sight of.

Epistaxis. Pengawar Djambi powder is recommended by Lubet-Barbon as an excellent hemostatic in epistaxis and in slow secondary hemorrhages after operation. The bleeding point is simply touched with the powder. No tampon is necessary.

ACCESSORY SINUSES.

There has been great activity in treatment of diseases of the various accessory sinuses during the past year. Perhaps there is a little too great a tendency to radical operation, but the cure by radical operation is as a rule so prompt and satisfactory and the treatment by conservative methods so tedious and results so uncertain that the temptation to resort early to operation is very great. With nose and throat work becoming more and more surgical it behooves the operator in this line to give careful attention to methods of asepsis as adapted to his particular field. In minor operative work in the nose, because of the difficulty of securing asepsis and the impossibility of securing it to any marked extent the tendency is to operate and leave the results strictly to Nature. If the operator's instruments are clean, infection rarely occurs in small operations, even when no attempts at cleansing the nose or wound are made, but in the larger operations now so much in vogue every effort should be made to assist Nature.

The sphenoid sinus, which has only recently come fully into the field, is becoming a frequent object of surgical procedure. While in chronic sinus disease the only means of cure is often surgical, it is well to remember that if the acute cases are recognized and treatment promptly instituted the number of chronic cases will be very much reduced. While the poor arrangements for drainage in the case of the maxillary and the sphenoid sinuses theoretically make a natural cure very difficult, yet the fact that Nature unaided takes care of a large proportion of the acute cases shows that the tendency to recovery is much greater than one might think. Every worker in this line has seen numbers of cases cured by simple measures which had been referred to him for operation.

Acute Inflammation. The increased prevalence of acute sinusitis in recent years is referred to by N. L. Wilson[1], who attributes the increase to the presence of influenza. As a predisposing cause may be mentioned anything which seriously hinders free drainage from the upper half of the nasal cavity. As exciting causes are recognized such infections as influenza, pneumonia, scarlet fever, measles, typhoid fever, diphtheria, smallpox, cerebrospinal meningitis, erysipelas and common colds. In diagnosis, pain of an aching character is an almost necessary symptom. As Wilson says, while pain is not necessarily present in chronic sinusitis, in acute, it is practically invariably so. Cessation of pain when the nasal discharge is free and its return when the discharge lessens or ceases is a marked characteristic. The location of the pain is of some assistance in determining the cavity affected, but occasionally it is deceptive.

In treatment it is urged that more attention be given to acute coryzas. Wilson's method is to put the patient to bed and secure relaxation and diaphoresis by a hot bath and the drinking of hot water or lemonade containing acetate or citrate of potash. Calomel is given in ¼-grain doses every hour till four doses have been taken and is followed by a saline. After the bowels and skin are active atropin

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(1) Gaillard's Medical Journal, July, 1903.

is given or a rhinitis tablet containing camphor, atropin and quinin. Locally, free drainage and thorough cleansing can be effected by a warm alkaline spray such as Dobell's and the application of adrenalin 1-5000 either by spray or on cotton pledgets, followed by an oily spray containing a small amount of menthol. [If the menthol is irritating simple benzoinol will be very grateful to the mucous membranes, but the mentholated oil is better if it does not irritate.—Ed.] If suppuration ensue washing out the accessory cavity affected with a mild antiseptic solution either through the natural opening or, in the case of the antrum, through a puncture in the inferior meatus, may be necessary. [As a general rule watery sprays in acute inflammations are irritating. It is much better to use a mild alkaline solution by means of a douche cup, either Dessar's or the Bermingham.—Ed.]

Chronic Inflammation. A. Strubell[1] has studied the statistics of the Vienna clinic of O. Chiari with reference to the *frequency* with which the various accessory cavities are affected in chronic cases. No reliable statistics have been published upon this subject except those of Killian. Several investigators have determined the frequency from post-mortem investigation, but this does not permit unmodified deductions to be drawn because the material for autopsy is derived largely from patients who have died of acute infections in which disease of the accessory cavities is quite frequent. Since, however, disease of some cavities heals more readily than others the proportion in which the various cavities are affected in chronic cases does not correspond to that which obtains in acute cases. The author finds in 29,819 cases, 556 cases of empyema of some of the accessory cavities. In 291 cases a differential diagnosis had been made and of these 77 affected the maxillary, 154 the frontal sinus, and 22 the ethmoid and sphenoid cells. There were 18 combined cases. A more exact examination of 88 cases showed 54 maxillary and 42 frontal cases, with 9 in which the ethmoid and sphenoid cells were affected.

The results of the author show a much more frequent affection of the frontal sinus than is the case in the ex-

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(1) Archiv für Laryngologie, B. xiv, H. 3.

perience of other observers. [In acute inflammation the frontal sinus is perhaps involved as frequently as all the other cavities combined, but this is not the case in chronic empyemas according to the usual experience.—ED.]

Diagnosis. A *new method* of diagnosis is presented by A. Hirschmann[1], who uses an endoscope for direct inspection of the accessory cavities, particularly the maxillary antrum. The diameter of the instrument is 5 mm. (1-5 inch). In the case of the antrum the examination is made through an opening drilled through a tooth socket. By inspection the condition of the mucous membrane is determined, enlargement of blood vessels, thickening, granulations, etc. Polypoid degeneration and its exact location may be discovered, so that any question as to the necessity for further opening and curetting is readily solved. The instrument may also be used in examining the nasal passages, the post-nasal space and the ear. If openings are made into the frontal, ethmoid or sphenoid sinuses these cavities may also be readily inspected. Hirschmann has used the instrument in 16 cases of antrum disease and 5 of ethmoid empyema.

Antrum. A *new method of diagnosis in antral disease* which is described by G. Malin[2] is given here simply as a matter of interest, though of little practical value. Malin remarks that when all the signs of pus in the maxillary sinus are positive one is justified in making the diagnosis of empyema of that sinus, but it still remains to decide whether the pus results from an inflammation of the sinus itself or whether it has accumulated there in consequence of having dropped into it from some other point, as the frontal sinus. There is no positive sign to settle this question or to determine when surgical intervention is appropriate. The author bases a new sign upon the fact that inflammation of the sinus tends to lessen its capacity, while, if it serves merely as a reservoir, the capacity of the cavity is not diminished. While the capacity of the entire sinus cannot easily be determined, it is possible to find how much liquid it will hold below the level of the opening into the cavity of the nose. The cavity of the

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(1) Archiv für Laryngologie u. Rhinologie, B. 14, H. 2.
(2) Annales des maladies de l'oreille et du larynx, Feb., 1903.

sinus is first washed out and as much water allowed to remain as the lower part of the sinus will hold. Then while the patient keeps his head in the same position the nozzle of an accurately graduated syringe is introduced into the opening and as much fluid withdrawn as can be removed. If this amounts to less than 1½ c.c. it is an evidence that the capacity of the sinus has been lessened by the encroachment of fungous vegetations and hence of the existence of a sinusitis. In such cases surgical intervention will be the means of effecting a cure while when the capacity of the sinus is larger than 1½ c.c. there is no sinusitis, but we must look elsewhere for the origin of the pus.

J. Guisey and E. Guerin[1] propose transillumination through the mouth as a means of distinguishing inflammation of the maxillary sinus from mere accumulation of pus (maxillary empyema). After thorough cleansing of the cavity from pus by means of lavage, the light will pass through the cheek if the cavity is lined with normal mucous membrane, but if there is thickening and inflammatory infiltration, the obscurity remains after the pus has been removed by lavage. The lavage must be very thorough, at least a liter of water being used so as to remove all pus. A strong lamp must be introduced into the mouth and the transillumination must be made immediately after the lavage.

In a long article detailing a number of experiments, C. Ziem[2] maintains his previously expressed opinion that transillumination is of no value in the diagnosis of antral disease except in distinguishing solid tumors from cysts. [It is undoubtedly the case that transillumination is not positively diagnostic in antral disease yet it is also undoubtedly true that in a large proportion of cases it furnishes very reliable evidence to the clinician.—Ed.]

In chronic cases which do not yield promptly to irrigation either through the natural opening or through an opening in the alveolar process, H. H. Curtis[3] advocates radical operation. The most generally satisfactory opera-

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(1) Annales des maladies de l'oreille et du larynx, June 1903.
(2) Journal Laryngology, Rhinology and Otology, June, 1903.
(3) Laryngoscope, October, 1903.

tion is through the canine fossa with a large counter opening in the inferior meatus, the former being sutured and allowed to close after curetting the cavity, subsequent treatment if necessary being given through the meatal opening. This opening provides for subsequent drainage.

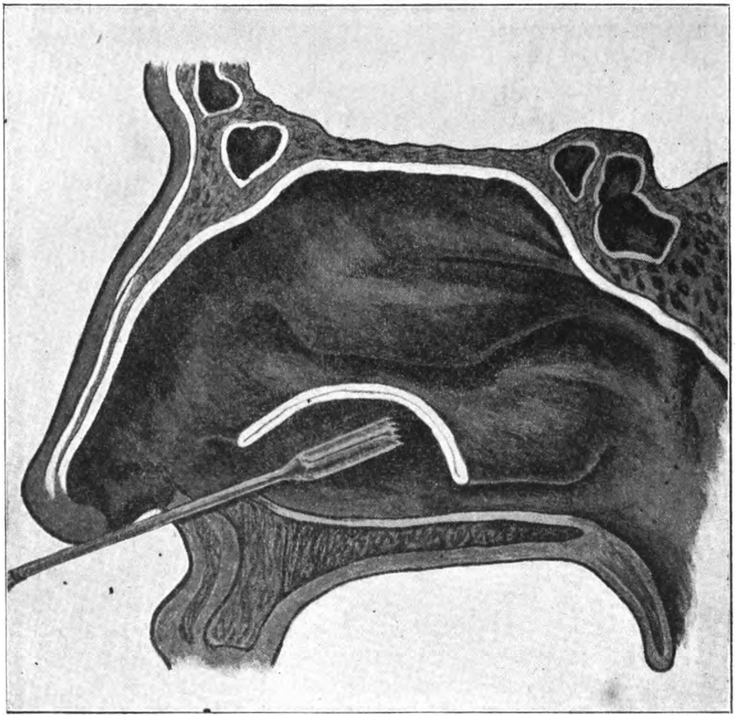

Fig. 28. Showing Trephine Over the Situation of the Proposed Fenestration, Before Turning Outward 45°.

Where it is thought best to operate less radically, Curtis makes a large opening in the inferior meatus after removing the anterior third of the inferior turbinate. This operation is done under cocain and adrenalin. The opening is made with a ⅛ to 3/16 inch trephine about .4 inch beyond the anterior point of attachment of the inferior turbinate and ¼ inch above the nasal floor. After puncture with the trephine the opening is enlarged with a burr drill. The cuts (Figs. 28 and 29) illustrate the operation. With properly curved flexible ring curettes the antrum may be reached quite satisfactorily. The cavity is now packed with gauze. [A *large* opening in the inferior meatus will furnish a satisfactory opening for subsequent irrigations by the patient. The operation with the Krause curved canula is very unsatisfactory even for simple irrigation and, of course, is not considered a radical operation.—Ed.]

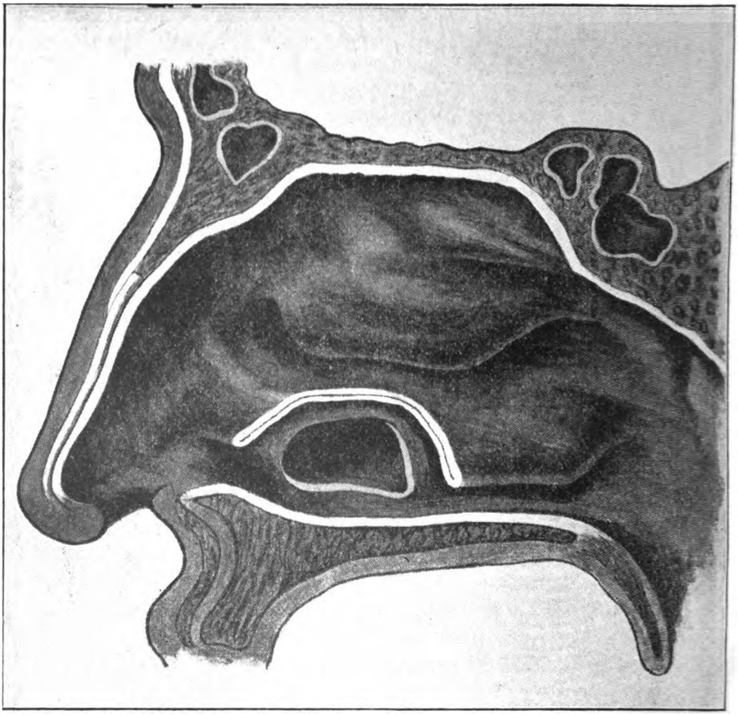

Fig. 29. Showing Perforation Completed for Radical Operation on Antrum Through the Inferior Meatus.

Opening of the maxillary sinus through the middle meatus is advocated by two very prominent operators. A.

Onodi[1] advises this operation and has devised a special trocar for the purpose. It has been proposed to break through the wall of the sinus with the little finger, but although this is feasible it is an unsurgical procedure and entails the risk of infection as well as uncertainty of the extent of the opening and risk of a failure in a number of cases. The instrument consists of a trocar made with two blades arranged like those of a pair of forceps so that by opening them the opening in the wall of the sinus can be enlarged to the extent of two centimeters (¾ inch). It is found to be an easy matter to enter the maxillary sinus with the instrument in the middle meatus. The only structures that there is any danger of injuring are the tear duct and the floor of the orbit. A little care will prevent any damage. The opening suffices for thorough irrigation of the cavity and gives an opportunity to pack it with gauze. L. Rethi[2] advocates the following method: Remove the anterior two-thirds of the middle turbinal; make an opening just back of the anterior point of insertion of the removed turbinal with a chisel and enlarge the opening with bone-forceps upward, downward and backward until a very free communication is secured between the antrum and the nose. Formerly he next packed the antrum with dermatol gauze (first cleansing the cavity) and allowed to remain for two days when the gauze was removed, the antrum inspected with a small mirror and the interior curetted. In his later operations the curetting has been done at the first operation. The operation is considered much less formidable by Rethi than an external one and is much more readily consented to by the patient. His results have been excellent and he has no hesitation in recommending the method above any other hitherto presented.

In a paper on the treatment of chronic suppuration of the accessory cavities Luc[3] presents his methods of operation. Operative measures should be resorted to only after cleansing through the natural openings has failed to cure and the empyema has become chronic. In maxillary sinusitis Luc still advocates the

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(1) Archiv für Laryngologie, B. xiv, H. 1.
(2) Wiener medizinische Wochenschrift, March 21, 1903.
(3) Annals of Otology, Rhinology and Laryngology, Sept., 1903.

Caldwell-Luc operation, in which a large opening is made in the canine fossa for the purpose of curetting the cavity and then an opening involving the destruction of a large part of the inner wall of the antrum is made into the nasal cavity to serve for cleansing and draining. His results with this operation in a large number of cases have been very good.

Sphenoid, Ethmoid and Frontal Sinuses. E. M. Holmes[1] makes a brief report on 237 cases of sinus disease. Of these, 182 or nearly 77 per cent involved the sphenoid sinus, both sides being affected in 19. In 56 of the sphenoid cases the ethmoid cells were also involved, while in 39 the ethmoid was affected, while the sphenoid remained healthy. Only 42 cases of antral empyema were found. Sixty-one of the cases sought treatment for ear disease and every one showed empyema of the sphenoid, of the ethmoid or of the two combined. Of the 237 cases, polypi were found in 31.

Treatment.—Of primary importance is the establishment of free drainage and the removal of all abnormal growths and diseased tissue which tend to keep up the suppuration. In a large number of cases removal of a part or the whole of the middle turbinal is necessary. Diseased cavities must be opened by forceps, drill, sharp spoon or some suitable instrument. All granulation and necrotic tissue should be removed as thoroughly as its location will permit. When possible the natural openings should be enlarged by removing portions of the bone about them. If good drainage cannot be secured without radical operation this must be resorted to.

"The prognosis is of much importance, and in its consideration we have to take into account not only the local lesions but the resulting diseased conditions produced by them, as complications in these organs at times produce the more distressing if not the only symptoms. It may be possible to remove all trouble in the nose and yet get no improvement in the existing ear complication. The throat symptoms are almost always relieved if not entirely removed. Unless there has been extensive destruction with

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(1) **Boston Medical and Surgical Journal, March 26, 1908.**

marked atrophy of the mucous membranes, a very favorable prognosis can be given, so far as the local symptoms are concerned. Even where there is atrophy with dry decomposing crusts accompanied by disagreeable odor, the prognosis is not necessarily bad. In fact in the majority of these cases the distressing symptoms are relieved. Where they are not, there is doubtless an affected area which has not been reached by treatment."

"In the 16 cases of suppurative frontal sinus, 7 were relieved by removing obstructions in the middle meatus and draining the ethmoid cells. Four of these I was able to cleanse through canula, but into the other three I could not even pass the probe and could only cleanse about the opening of the infundibulum. Eight were apparently of a more severe type, and persisted after all internal treatment had been applied. Upon six of these I performed the external operation, and obtained good results in all but one. In this case both sides were diseased and there was extensive ulceration with much granulation tissue in the right sinus. There was free drainage into the nose on both sides, but the external wound remained open and discharged for nine weeks, when I again explored the cavity and removed a large amount of broken-down material. At the end of another eight weeks the cavity became closed, but there was marked deformity. Two patients refused to have an external incision, and in one the symptoms finally ceased to be troublesome, while in the other there have been many exacerbations of pain with occasionally a discharge of pus into the nose.

"In dealing with ethmoid suppuration there is such a labyrinth of cells, any one of which may be diseased, it is impossible to estimate with any degree of certainty the length of time necessary to produce a cure. Many cases where the symptoms are very severe and of long standing are relieved in a short time and others apparently less severe may take months. Fourteen in this series I discharged well in three weeks. Of the others 23 were well within two months, and 16 others within three months; 24 were apparently well after periods varying from three to six months, and 11 others after longer periods. The remaining cases were either not free from pus after long treatment, or after treating for a while, they failed to report for further examination.

"The sphenoid cavity though large can be so thoroughly exposed and drained that the great majority of cases when not complicated are cured in a comparatively short time. In the 182 cases in this series there were only five of the non-complicated which were not cured by the end of six months. Two of these are discharging pus at present, although I can find no reason for it, unless, as sometimes happens, there is some small cavity which is diseased and communicates with the sphenoid. Eighteen cases were apparently well by the end of three weeks, 15 by the end of four weeks. Fifty-one cases were free from symptoms by the end of two months. Sixty-seven cases were under treatment between two and three months. Of the 26 remaining cases, 8 were discharged during the fourth month, 11 during the fifth month, and 7 during the sixth month. In nearly every case which was not free from symptoms by the end of two months there were either large areas of denuded bone or other cells were found to be diseased and discharging with the one under treatment. Even in the protracted cases the more severe symptoms as pain, pressure, dizziness, profuse discharge, etc., in the majority of cases, are quickly relieved."

In frontal sinusitis Luc[1] makes a large opening at the inner orbital edge, including the floor of the sinus and extending downward to the ascending branch of the maxillary bone, thus giving full opportunity to widen the fronto-nasal duct and curette the ethmoid cells. In case the sinus is found to be of small size it is not necessary to extend the opening so far downward, thus avoiding some deformity.

For destruction of the ethmoid cells Luc has abandoned the use of curettes as unsatisfactory and now uses forceps with flat blades with which he grasps and tears off the middle turbinal, a piece at a time, following this up by breaking into and crushing off the ethmoid cells until all are removed. The operation is done under cocain and adrenalin, gauze packing being resorted to at various steps of the operation to control hemorrhage. In chronic

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(1) Annals of Otol., Rhinol. and Laryngol., Sept., 1903.

suppuration of the sphenoid sinus Luc makes entry through the maxillary antrum if there be a coincident empyema of that cavity, otherwise he clears out the middle turbinal and ethmoid cells and opens through the nose. In case the antral route is chosen he does the radical antrum operation and with forceps or curette breaks through the superior posterior antral wall, making the two cavities continuous. This operation is certainly the ideal one when both cavities are diseased.

L. Picque and J. Toubert[1] believe that the surgical way of treating persistent empyema of the frontal, ethmoid or sphenoid cavity is by a large external opening. Intranasal operation is difficult, dangerous and usually ineffectual for relief. The operation which they advocate and which they have done successfully is as follows: An incision shaped like the figure 7 is made, the horizontal arm being in the eyebrow, the vertical being carried along the internal border of the orbit, then down the groove made by the nose and cheek. The vertical incision is carried to the bone, the horizontal is not. Elevate the periosteum along the vertical incision and then after marking the line of bone section cut through with the chisel along the fronto-nasal suture, fronto-maxillary suture, precanine depression and the suture uniting the nasal bones. Now cut through the mucosa, turn back the nose and good access is had to the nasal cavity, permitting the removal of ethmoid cells and exposure of the sphenoid or frontal sinus, which may be easily opened under good light.

The dangers of the operation are only those incident to any surgical procedure and should be less than intranasal operation. The chief objection is the possible or probable external deformity which the operators aver to be very slight.

Facial Neuralgia. W. Peyre-Porcher[2] reports 5 cases of facial neuralgia or tic douloureaux cured by correction of nasal or antral disease. Several of the patients had previously submitted to one or more operations without relief. In one case there had been four operations: extraction of all the teeth, resection of the supra-orbital

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(1) Annals of Otol., Rhinol. and Laryngol., March, 1903.
(2) Laryngoscope, August, 1903.

nerve, removal of the sphenopalatine ganglion and finally removal of the gasserian ganglion. In all of the cases operation for the relief of pressure from enlarged turbinates or badly deflected septums or for relief of antral disease resulted in cure.

THE NASOPHARYNX.

Chronic nasopharyngitis is perhaps the most discouraging inflammation of the upper respiratory passages that the physician is called on to treat. Those cases which are not too chronic and are dependent on obstruction of the nasal passages are generally cured by restoring free nasal respiration. Those which are not thus relieved are very difficult of relief by any local treatment hitherto practiced. The cause and treatment of these inflammations were the subject of a discussion before the 1903 meeting of the American Laryngological, Rhinological and Otological Society.[1] The paper evoking the discussion was presented by L. A. Coffin. Like many others the author has been impressed by the large number of his clinic patients who complained only of post-nasal catarrh. The disease *per se* is a local one, the pathology, that of a cirrhotic membrane. The commonest basic principle in the etiology is irritation with resulting hyperemia. The circumscribed area affected is against the view that the condition is the result of a general toxemia. As the anterior nares frequently escape the disease altogether, it is evident that one must look elsewhere than to the inspired air. Children, who seldom have great structural deformity of the nose, are quite as frequently affected with post-nasal catarrh as are adults. Coffin believes the chief cause of the pathologic condition under discussion is the irritation resulting from eructations of gases from the stomach. If we accept chronic follicular pharyngitis and nasopharyngitis as frequently secondary to chronic indigestion and base our treatment on this assumption we shall secure better results in these cases. Hyperacidity is a most common cause and the reason it is overlooked is that the great majority of these persons give no symptoms pointing to gastric disorder. The

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(1) Laryngoscope, September, 1903.

author arrived at his conclusions from the examination of a series of cases by modern methods for stomach disorder and a comparison of the results with the condition of the nasopharynx present in the cases. J. A. Thompson believed the regurgitation of irritating secretions during sleep is often responsible for pharyngitis and rhinitis. He had seen cases of marked laryngitis which had proved absolutely rebellious to treatment until hyperacidity of the stomach had been diagnosed and properly treated. A case showing the influence of other stomach diseases was cited. A patient had come to him with a superficial ulceration on the tonsil which did not resemble either syphilis or tuberculosis. The case was on his hands for months; at one time healing and at another breaking down. A chemical examination showed complete absence of hydrochloric acid in the gastric juice. As a result of the examination this acid was prescribed internally and the ulceration was speedily and permanently healed. He believed that in all obstinate cases the stomach should be subjected to careful examination.

MacCuen Smith had found that so-called "bilious spells" were often associated with coryza and hoarseness and more or less pain. The cases would improve wonderfully if given 1-10 of a grain of calomel every half hour for about ten doses, followed by a saline next morning. Many cases of dry throat would show great improvement if given hydrochloric acid twenty minutes after a meal instead of immediately after. In persons suffering from frequently repeated attacks of coryza the underlying condition is often an intestinal intoxication. High injections into the colon of luke-warm normal salt solution will often prove beneficial. L. C. Cline thought that if this line of investigation were pursued more generally there would be much less of the saw and cautery. The time has come when careful study of the secretions and better general treatment is demanded.

J. White, W. L. Ballenger, D. Roy, C. G. Coakley and W. C. Phillips, while agreeing that gastrointestinal disorders might be etiologic factors in some cases yet believed the nasopharyngitis to be much more often due to local disease in the upper respiratory passages themselves. J. A. White believed that gastric disorder is much more often due to swallowing the irritating secretions from the nasopharynx than is nasopharyngitis due to stomach disease.

[To the Editor the above discussion brings out one valuable point in the treatment of this disease. That is that we must always be ready to look beyond the part about which the patient complains, for a possible cause of the disorder. In many instances a glance at the throat will show clearly that the patient is overeating and not eliminating and that the mucous membranes are helping to throw off the waste. Again, the relaxed reddened membrane will give pretty conclusive evidence that the patient is indulging too much in alcoholics, while a perhaps more reddened but decidedly less flabby appearance may be due to smoking. In all of these cases and in those due to nasal obstruction the indications for treatment are very clear and if yielded to by the patient curative results will follow. In a large class of cases, however, there does seem to be a sclerotic change in the mucous membrane which defies ordinary treatment and which still awaits an effective method of treatment. In all cases simple cleansing by mild alkaline solutions through the nose with a Dessar douche cup will give much relief.]

Pharyngeal Tonsil. The subject of adenoids has not occupied quite so much space in the journals during the past year. The radical operators have had the field for several years, but the Editor is gratified to see a tendency on the part of operators generally to rely on their own judgment in this as in other medical and surgical matters and not to follow blindly those who insist on cutting and scraping till every vestige of an organ, which is normally present in practically every child, is removed. An enlarged pharyngeal tonsil is a source of great danger and injury to a child and should always be removed if it is causing any symptoms of obstruction. Even the most radical operators find it necessary occasionally to operate a second or third time. There are undoubtedly individuals who might be called "tonsil growers" in whom enlargement will occur if there is the least vestige of the tonsil left. In at least nine out of ten children at from five to ten years old, however, if the pharyngeal tonsil be removed by one or two strokes of a sharp curette carefully applied in the middle line and a stroke in each post-eustachian fossa, all symptoms due to nasopharyngeal obstruction will disappear permanently. The one in which this is not true is a proper subject for a very radical operation, but it seems hardly right to use a general anesthetic and do a needlessly radical operation on nine patients in order to catch the tenth.

H. Beckmann[1] regards *inflammation of the pharyngeal tonsil* as a characteristic affection and by far the most important and frequent disease of the upper respiratory passages. The swollen gland can be seen with the rhinoscope as a light, brick red tumor sometimes covered with pus, and filling up the upper part of the nasopharynx. In children it can sometimes be seen by strongly depressing the tongue. If the tonsil alone is affected no symptoms may be noticed, but it may lead to most serious general infection, as, for instance, acute rheumatism. Most commonly the mucous membrane of the nose is also inflamed and it is a characteristic of the disease of the pharyngeal tonsil that after a coryza marked by watery secretion a decidedly purulent discharge occurs which is obstinate to cure. Frequently the accessory cavities of the nose become affected and the formation of empyema of one of the sinuses is the result. Inflammation of the middle ear and of the lower respiratory passages may also result. The most important therapeutic indication is the removal by cutting instruments which may secure brilliant results in the treatment of diseases of the air passages and middle ear.

The influence of the tonsillar ring and especially of the pharyngeal tonsil upon the general condition of the organism is discussed by W. N. Nikitin[2], who believes that the collection of lymphatic tissues around the opening of the pharynx constitutes a whole such that all parts are as a rule affected simultaneously, although it may be to different degrees. The normal tonsils scarcely project above the mucous membrane. They are, instead of being possessed of phagocytic or protective powers, especially liable to infection to a greater degree than other parts of the mucous membrane. Chronically inflamed tonsils do not tend to recovery as the years pass as has been assumed.

The effects of enlargement of the pharyngeal tonsil are

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(1) Berliner klinische Wochenschrift, Dec. 15, 1902.
(2) St. Petersburger medicinische Wochenschrift, July 5, 1903.

well recognized and of two classes, mechanical, and catarrhal or infective. The infective influence may extend to the lower respiratory organs and even to the digestive tract. Important infections as rheumatism, pyemia, tuberculosis, may have their starting point in the tonsils. The disease is ordinarily a disease of childhood, but can also occur in adults whose tonsils were previously sound. It may also be hereditary. It is an important question whether tuberculosis of the lymph glands of the neck is primary or secondary to the infection of the tonsil; the evidence seems to be in favor of the tonsillar lesion being primary. The experiments of Schlenker seem to show that the tonsils are infected in most cases by the sputum from tuberculous lungs and seldom by food or inhaled dust.

The treatment of the enlargement of the pharyngeal tonsil can be only surgical and should include the complete removal of the diseased tissue, since, if any is left a recurrence of the difficulty is to be feared. For the purpose of completeness some authors recommend general anesthesia, but the author has not found it necessary to employ it.

R. C. Myles[1] believes that while it is quite proper for the general practitioner who is remote from a specialist to operate on the enlarged pharyngeal tonsil yet in such case only the curette should be used. The possibilities and indeed the probabilities of injury from the use of adenoid forceps in the hands of any except the skilled operator are so great that only the latter should use them. On the other hand a careful operator who bears in mind the anatomy of the nasopharynx can scarcely do any injury with a curette and he will nearly always be successful in removing such a large part of the hypertrophy as to give complete relief from the symptoms. Myles advises operation under cocain anesthesia, using solutions of strength from 10 to 100 per cent by means of a cotton carrier passed up behind the palate every five to ten minutes for thirty minutes. He also uses a spray of .1 per cent cocain in the nose and then uses cocain on cotton carriers through the nose. One sweep is made with a sharp curette in the

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(1) Journal Am. Med. Assoc., March 21, 1903.

median line, then the curette is reintroduced and rapid and moderately firm scrapings are made in both of Rosenmüller's fossæ and over the posterior pharyngeal wall. The finger is then introduced and any remaining masses are broken up and smoothed down.

L. J. Lautenbach[1] still continues to advocate the use of the fingernail in the removal of adenoids in children. He uses either the natural fingernail or an artificial one of steel and usually operates without a general anesthetic. The method is generally condemned by specialists. Any one who has tried to remove adenoids in a child of 7 to 10 years with a curette only moderately sharp, knows the difficulty often encountered in cutting through the growth.

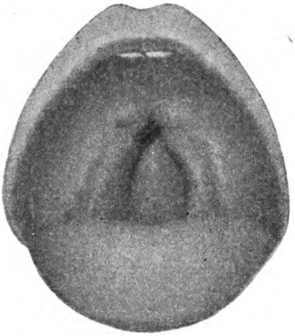

Fig. 30. Rupture of Palate. See Chappell's Article.

It is the Editor's opinion that the simple introduction of an adult forefinger into the nasopharynx of a child for purposes of diagnosis is productive of almost as much discomfort to the child as the complete operation with a sharp curette.

The subject of *traumatism* during adenoid operations was the subject of a paper by W. F. Campbell[2] before the New York Academy of Medicine. Among the accidents mentioned were the tearing off of a portion of the vomer, injury to the eustachian prominences and lacerations of the soft palate. The author presented a case in which a complete rupture of the soft palate had occurred during an

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(1) Journal American Medical Association, March 28, 1903.
(2) Medical Review of Reviews, Nov., 1902.

operation for adenoids. The patient was a boy aged seven years, who had been operated upon under general anesthesia two weeks before he was brought to Chappell. The author suggested that the temperature be taken in the case of children before operation, as by this means the onset of an acute disease may be detected and operation deferred. In discussing the paper one of the speakers stated that he had had rupture of the soft palate occur in a child who struggled to get away. Others reported having seen cases in which the palate had been caught in forceps and cut, the uvula being particularly liable to this accident.

Phillips said that one of his assistants in operating with forceps had removed a considerable section of the vomer. Other injuries were cited by other speakers and the general trend of the discussion would show that such an apparently simple operation as adenectomy may result disastrously in the hands of a careless or inexperienced operator.

Macaud[1] records a case of paralysis of the velum palati occurring six weeks after a mild attack of diphtheria, which was attributed by the attending physician to diphtheria, being regarded as a late appearing diphtheritic paralysis. Difficulty of speech, of nasal respiration, and of deglutition developed *pari passu* with the growth of vegetations in the nasopharynx. The temperature rose to 40.2 C. Removal of the growth resulted in immediate improvement and prompt recovery. The author believes the condition was due to an acute adenoiditis, which probably produced the symptoms partly by infection and partly by mechanical pressure. The timely operation was undoubtedly the means of saving life, as the child seemed to be in a dangerous condition previous to the operation and was daily growing worse. The time which elapsed after the diphtheritic attack was longer than is usually the case with diphtheritic paralyses and the occurrence of fever was more easily accounted for by infection than by a toxemia from a former diphtheria since diphtheritic paralysis is not accompanied by fever. The diagnosis of diphtheritic paralysis should not be made in cases where there is a probable local cause until the removal of the local lesion

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(1) Annales des maladies de l'oreille et du larynx, Oct., 1903, p. 344.

has shown whether it was responsible for the paralysis or not.

Complications. An interesting case is reported by W. F. Chappell[1] in which malaria with high fever developed in a babe of five months, two weeks after an adenectomy. The malaria plasmodium was found in the blood and the history of mosquito infection was very clear. The fever yielded only to maximum doses of quinin.

Death after removal of tonsils and adenoids in a boy of seven years is reported by F. J. Steward[2]. The bleeding was excessive at the time of operation (ether anesthesia), but ceased spontaneously. Two hours later extravasation of blood occurred in the neck and one cheek and gradually extended downward to the clavicles. A few hours later extravasation also took place into the pharyngeal submucous tissue, necessitating intubation, followed three hours after by tracheotomy. Notwithstanding saline infusions and stimulants death occurred thirty-two hours after operation. Although there was no history of hemophilia the author is satisfied that there must have been such a diathesis.

Death from secondary hemorrhage four days after removal of adenoids in a boy aged three years is reported by P. G. Goldsmith[3]. In this case also, both faucial tonsils and the adenoids were removed at one operation under chloroform anesthesia. The patient had returned to his home 100 miles distant and from the report on the case it was evident to the author that no proper means were used to check the hemorrhage which was entirely pharyngeal.

A. E. Bulson, Jr.[4], reports a severe case of secondary hemorrhage after removal of tonsils and adenoids in a boy of six. The hemorrhage came on 8 or 10 hours after operation, the blood being swallowed, so that the bleeding was not discovered till the patient vomited a large quantity of blood. The patient was in a collapsed condition when Bulson reached him, but the hemorrhage had ceased. A saline solution was given, first by rectum and then by hypodermoclysis, one pint being used by the latter method.

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(1) Medical Record.
(2) Lancet, November 15, 1902.
(3) Canadian Jour. Medicine and Surgery, March, 1903.
(4) Laryngoscope, March, 1903.

Nine hours later Bulson found the patient in an apparently dying condition, temperature 106, pulse uncountable. Stimulants were given and more saline injections, and ultimate recovery took place. Bulson believes the patient had bled again, swallowing the blood, but as no more blood was vomited and the throat was dry this was not certain.

[The Editor believes that the three-fold operation—double tonsillotomy and adenectomy—should never be done at one sitting. While in the case reported the extent of the operation probably had nothing to do with the serious hemorrhage, yet as a general principle he cannot regard the three operations at one sitting as justifiable. There is not a major operation done at the present day in which there is such a great loss of blood as occurs on the average in children when the three tonsils are removed at once. Many times it requires from one to three months for a child to regain strength and color after such an operation. This is one objection to the use of a general anesthetic in such cases. In a child with three tonsils to remove there is a great temptation to complete the operation at once in order to avoid another anesthetization, while the hemorrhage is much increased on account of the congestion from ether where the latter is used.]

Malignant Tumors of the Nasopharynx. In an article on this subject F. J. Quinlan[1] reaches the following conclusions:

"The prognosis of malignant growth of the naso- and oro-pharynx is very unfavorable. The succulent tissues in these regions prove very suitable for the rapid growth and diffusion of malignant disease.

"In spite of our advances in treatment, in ligation of the carotid, the application of the Röntgen rays and progress in operative surgery, this unfavorable prognosis has only been slightly modified for the better. The main reason for the apparent failure is that malignant disease in these regions is not recognized early enough. The only thing that will save the unfortunate victim of the dreadful malady from a fatal termination is the quick action of the clinician in determining the exact nature of the conditions before him in a suspicious case. In this matter it

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(1) Laryngoscope, May, 1903.

must be realized that omission is as fatal as commission. The only recourse is surgery and the longer the experience of the specialist the more he is apt to say, 'Shun delays, they breed remorse.' There is no region in the body where the flames of malignancy devour tissues with such greed as in the rhino- and oro-pharynx.

"When patients are in middle life then and when symptoms are suspicious, very careful examination should be made and if the clinician can not satisfy himself as to the exact nature of the condition present a consultant should be called. Every day of delay makes the prognosis worse. Temporizing measures are almost criminal. Malignant growth in this region very soon spreads beyond all possibility of operative relief by any means. Surgical intervention must be insisted on, just as soon as the diagnosis is made, if we wish to give our patients the only chance for life and at the same time satisfy our own better judgment."

MOUTH, PHARYNX, TONSILS.

Mouth. The influence of affections of the mouth and teeth in disease of the nose and throat has called forth a number of excellent articles during the year, among them those of R. H. Woods[1], E. W. Roughton[2], Kate W. Baldwin[3], D. D. Smith[4].

The mouth is often a veritable culture medium for pathogenic bacteria and careful asepsis should be looked after in all cases of operation where the wound is to come in contact with the saliva. In any serious operation the teeth should be thoroughly cared for by a dentist before time for operation when possible. Pyorrhea alveolaris is a frequent source of infection for all parts from the lips to the stomach. Diseases of the fifth nerve are very commonly the result of diseased teeth, in many instances the offending tooth being discoverable only on a very careful examination, the patient not making any complaint of the

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(1) Dublin Journal of Medical Science, Feb. 2, 1903.
(2) Lancet, Sept. 27, Oct. 18, Oct. 25, 1902.
(3) Journal Am. Med. Assoc., Jan. 31, 1903.
(4) Philadelphia Med. Jour., March 28, April 4, 1903.

teeth. Ludwig's angina nearly always and cervical adenitis very frequently are due to infection from the mouth.

The efforts on the part of the tuberculous patient at the order of the physician to secure pure fresh air are often nullified to a considerable degree by the septic condition of the mouth. Some of the patients, as suggested by Smith, might go to the best climate in the world and yet never get any pure air because every breath would be polluted by the foulness in the mouth which is distributed more or less to the oropharynx. See that the cause of foul air in so far as the patient himself is responsible for it is fully removed before sending him away from home or even directing him to stay in the open air at home.

While these facts are all well known, yet the numerous instances in which they are overlooked clearly indicate the necessity for frequently bringing them to mind.

High-Arched Palate. M. H. Cryer,[1] speaking from the standpoint of the dentist, states that it is almost impossible in mouth-breathing children to secure a regular and proper development of the alveolar arches containing the teeth, so long as the nasopharynx is left filled with adenoids. He refers to a personal experience, in which, after working hard for a year trying to regulate the teeth of a child of eight years with little progress, a rhinologist was called in to remove the adenoids. After this it was comparatively easy to accomplish what had been practically impossible before. The pressure of the tongue when the mouth is closed has a marked influence in spreading the arch of the mouth in a normal child.

Mayo Collier[2] believes that rarefaction of the air in the nasal passages due to mouth-breathing is a considerable factor in the contraction of the nose and consequent irregularities of the alveolar arch. Undoubtedly all of the factors mentioned by these several authorities have a decided influence on palatal and teeth deformities and it must be apparent to every one that to assure a parent, as is sometimes done, that the effects of adenoids in a given case will disappear with the natural atrophy of the pharyngeal tonsil which usually occurs at puberty is a rank injustice

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(1) Laryngoscope, December, 1902.
(2) Lancet, October 18, 1902.

to the child and very culpable on the part of the physician giving such advice.

In a very interesting paper on the arch of the palate H. L. Swain[1] gives details of measurements of a large number of skulls and discusses the influence of various factors in producing deformity of the palate and the influence of the latter on the nasal septum. His conclusions are:

First, that it is possible by deforming processes which artificially alter the shape of the skull to produce a change in form and shape of the hard palate.

Second, that under these above-mentionel conditions the septum seems to conform itself to the altered development of the rest of the face, rather contrary to our previous ideas regarding the habits of this structure.

Third, that if from arrested or retarded development of the superior maxilla the palate fails to descend to its proper level, a bent septum is as liable to be produced as when the palate is arched too greatly by an unnatural narrowing process. Hence a palate of perfectly normal height as compared to breadth may produce a bend in the septum.

Fourth, that in considering the various causes which produce the abnormalities of the palate, we must lay more stress upon the lack of proper aeration of the maxillary sinuses retarding their development and hence that of the whole superior maxilla.

Fifth, the conservation and general care of the deciduous teeeth help to produce a normal horizontal curve in the hard palate and lessen the tendency to narrowing.

S. Bentzen[2] presents a large mass of statistics in the discussion of the cause of the high arched palate. He concludes that the presence of adenoid growths in the nasopharynx is an important factor in palate deformities. Any obstruction to nasal breathing in the developmental period by lessening the use of the organ naturally interferes with its development with the result that the palate tends to rise instead of being pushed down by the proper development of the nose. All cases of adenoids with obstructed

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(1) Laryngoscope, October, 1903.
(2) Archiv f. Laryngologie u. Rhinologie, B. 14, H. 2, 1903.

nasal respiration do not, however, develop high palates so that there must be other factors in the etiology. An important factor seems to be a rachitic tendency. The author seems to be in doubt as to the influence of septum deviation on the palate and *vice versa.*

Tongue. Cancer. H. Burt[1] exhibited before the London Laryngological Society a woman (single) of 24 with epithelioma of the right side of the tongue. Iodid of potassium caused almost complete disappearance of the growth, but while the drug was still being taken and in spite of increased dosage the tumor began to enlarge again and increased in size very rapidly. It is well recognized that iodids may cause prompt reduction in size of malignant tumors and this fact must be kept in mind continually in dealing with supposed gummata.

Lingual Tonsil. L. Depoutre[2] reports a case of *periamygdalitis of the lingual tonsil.* Inflammation of this structure has been noticed by several observers and has been divided by Simonewski into two forms: follicular tonsillitis and periamygdalitis. It occurs in the course of an ordinary angina and presents severe general symptoms as well as local pain, tenderness, inability to swallow, and the feeling of the presence of a foreign body. The voice is clear, but has a nasal tone and the respiration is unhindered. Laryngoscopic examination when possible, shows a long, red swelling at base of the tongue in front of the epiglottis which it sometimes pushes back. The glands are seldom swollen except those above the larynx and those beneath the chin. The treatment is free incision, which should be made as early as possible so as to avoid the danger of edema of the larynx.

Accessory Thyroid. E. L. Shurly[1] reports an accessory thyroid about the size of a small hen-egg attached well down at the very base of the tongue a little to the right of the median line. The patient was a girl, aged 16 years. Removal was accomplished under chloroform with a wire snare. Myxedema resulted from the operation necessitating the administration of thyroid extract. R. Winslow[2]

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(1) Journal Laryngol., Rhinol. and Otol., Jan., 1903.
(2) Annales des Maladies de l'Oreille et du Larynx, May, 1903.
(3) Philadelphia Medical Journal, Sept. 13, 1902.
(4) American Medicine, Dec. 13, 1902.

reports a case almost exactly like Shurly's in a girl of 17. In this case removal was made under ether through an incision from the chin to the hyoid bone. Winslow says, "A moderate-sized, rounded, elastic tumor, situated at the base of the tongue and covered by smooth, normal or congested mucous membrane, not painful, with no metastases, growing slowly and occurring usually in young women, is almost certainly a neoplasm consisting of thyroid tissue. These growths do not usually present any alarming symptoms, but should be removed when they give rise to discomfort, or cause difficulty in deglutition or respiration."

The Pharynx. P. R. W. de Santi[1] presents the histories of four carefully studied cases as bearing on Semon's opinion that the various forms of *acute septic inflammations* of the throat such as acute edema of the larynx, edematous laryngitis, erysipelas of the pharynx and larynx, phlegmon of the pharynx and larynx and angina Ludovici are probably pathologically identical. De Santi's cases were respectively, ordinary erysipelas; acute edematous tonsillitis and pharyngitis; acute gangrenous inflammation of the throat, and severe septic pharyngitis with deep-seated inflammation of the neck and septicemia. His bacteriologic findings fully support Semon's contention, the streptococcus pyogenes being the germ actively present in every case.

The *treatment* advised, and which was followed in these cases, is the injection of 10 to 20 c.c. of antistreptococcus serum in all cases where examination shows the streptococcus pyogenes present. In addition to this large doses tinct. ferri chlor. are advised and local application of pure carbolic acid to any gangrenous part. He considers cold applications contraindicated.

Tubercolosis. Two cases of tuberculosis of the pharynx in children aged respectively ten and eight years are reported by P. Schoetz.[2] In one case the pharyngeal appearance led to a diagnosis of diphtheria, but subsequent observation revealed the true nature of the case. In this case lung symptoms preceded the appearance of the disease in the pharynx. In the other, the pharyngeal disease was

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(1) Journal Laryngol., Rhinol. and Otol., April, 1903.
(2) Deutsche medicinische Woch., Oct. 15, 1903.

an early manifestation if, indeed, not primary. The author is not able to offer much in the way of treatment. The brilliant results often obtained in tubercular ulcerations of the mouth and pharynx by the use of lactic acid 25 to 50 per cent or guaiacol 10 to 20 per cent leads one to think of these remedies first in such cases. All local treatment should be very gently used and dysphagia relieved by orthoform.

E. Sokolowsky[1] has investigated the *frequency of occurrence of tuberculosis* in inflammation of the pharynx, especially of the lateral form, where lymphoid tissues similar to the tonsils are involved. He found no cases of primary affection of these parts, but frequent secondary involvement. The method of infection seemed to be either by the lymph channels or by the action of infected mucus or sputum. He arrives at the following conclusions:

1. Granular or lateral pharyngitis in cases affected with tuberculosis of other parts, especially in cases of lupus, is frequently of a tuberculous nature. 2. The form of tuberculosis of the granules or lateral lymphatic tract corresponds to the so-called latent form of tuberculosis of the tonsils. 3. The extirpation of the granules and lateral tracts might be taken into consideration, in many cases for diagnostic, in others for prophylactic and therapeutic purposes.

Syphilis. False membranes in the throat may be due, aside from the well-known forms caused by the diphtheria bacillus and by the streptococci, to various causes, among which is secondary syphilis which G. Bellan[2] has made the subject of an inaugural thesis. The condition has been recognized by various authors. Pseudomembranous angina may be the first manifestation of secondary syphilis, the chancre having been overlooked and the diagnosis thus rendered very difficult. Certain peculiarities in the course of the disease should cause syphilis to be suspected. The patient usually complains first of difficulty of swallowing and rarely recalls any decided chill or symptom of fever. The long persistence of the dysphagia is a characteristic of great importance. The examination

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(1) Archiv für Laryngologie, B. xiv, H. 3.

(2) These de Paris, 1902. Gazette hebdomadaire de Médecine et de Chirurgie, Oct. 23, 1902.

of the throat shows reddened fauces with grayish white patches upon the tonsils. These patches may be found upon the pillars of the fauces, but very rarely upon the posterior wall of the pharynx. The constancy of ulceration under the false membrane is very characteristic of syphilitic angina. Swelling of the glands, usually bilateral, is very pronounced. Mucous patches and syphilitic skin eruptions may clear up the diagnosis. The breath is not fetid and there is no albuminuria.

Cicatricial Contractions. A case of *adhesion of the posterior pillar to the pharynx,* due to diphtheria and scarlet fever is reported by G. H. Makuen.[1] The patient was an unmarried woman of 28, who had had a severe attack of diphtheria, followed by scarlet fever at the age of 5 years. Makuen wrote to 300 American laryngologists asking their experience with such cases. The replies showed a total of 449 cases of cicatricial deformities of the upper respiratory passages which the reporters believed to be due to some other cause than syphilis. Of these, 347 involved the nostrils,. 87 the pharynx, 14 the larynx, 1 the trachea. While these deformities may be due to other causes than syphilis yet undoubtedly many that are attributed by the patient to diphtheria or scarlet fever are really the result of acquired or hereditary syphilis. Trauma is responsible for a few cases. Makuen's paper was discussed by a number of members (American Laryngological Association) and there was practical agreement that these cicatricial contractions are rarely due to any other cause than syphilis, although it is often difficult to get a history of syphilis and the patient is prone to attribute the condition to some other cause.

Retropharyngeal Abscess. W. Downie[2] records a case of considerable interest on account of the advanced age (79 years) of the patient. The swelling and great pain existed for three months before the patient came into the author's hands and had led to a diagnosis of malignant disease. Incision, with evacuation of a large amount of pus resulted in perfect recovery.

Cancer. Primary cancer of the epipharynx is very rare.

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(1) Laryngoscope, October, 1903.
(2) Glasgow Medical Journal, March, 1903.

In a very exhaustive paper on the subject H. W. Loeb[1] describes a case seen by him and gives a brief synopsis of all cases, 38 in number, previously reported in the literature. He excludes cases originating in the nose, tongue, tonsils or lower pharynx. Although so rare the symptoms are so positive as to render an early diagnosis possible. The early symptoms are pain, deafness, tinnitus, nasal obstruction, fetid and bloody discharge on the affected side, unilateral paralysis of the palate and of some of the muscles supplied by the facial. Later symptoms depend on extension to and through the cranial base with involvement of the important structures there found. Surgical procedures offer no hope of cure, absolute or relative. If there is any hope at all it lies along the line of x-ray work.

Light Therapy. H. Strebel[2] has applied cold light to the treatment of chronic pharyngeal catarrh and other affections of the pharynx with marked success. The general use of light baths, sunbaths, etc., for the general treatment of pharyngeal disease has long been known. The effect of light upon the skin or mucous membrane is to set up a therapeutic inflammation which in healing removes the effects of pathologic inflammation, such as ecstasy of the blood vessels, exudates into the mucous membrane, etc. Light accompanied by heat may produce reddening of the mucous membrane, a true burning of the surface, but this is of no special advantage. It is important in this treatment to secure the action of the blue and violet rays which are of value on account of their chemic activity, while the red and yellow rays are of no value. The author uses an arc lamp and cools the light by a stream of water. Not too great a space should be illuminated at one sitting. The rays should be projected perpendicularly upon the surface. Care should be taken not to include unaffected areas as, although no permanent injury will result, much inconveniense may be occasioned. The effect is the greater if the blood be driven from the part by compression with a quartz compressor, which is placed in front of the stream of light. The time of application must vary with the character of the disease and the sensitiveness of the patient, from 1 to 6 minutes with

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(1) Laryngoscope, Dec., 1902.
(2) Archiv für Laryngologie, B. xiv. H. 1, 1903.

compression or 2 to 15 minutes without. The treatment has been serviceable in the treatment of pyorrhea and other affections of the mouth as well as in the pharynx. The attempt to apply this light to the larynx has not been very successful.

THE TONSILS.

Histology and Pathology. The medical profession is much indebted to J. L. Goodale for the great amount of research work which he has done on the tonsils in the past few years. In a recent contribution[1] on the endothelial phagocytes of the tonsillar ring he offers the following conclusions:

It is evident that in the normal tonsils, both of man and of a variety of the lower animals, large mononuclear phagocytes are present, which appear to be derived from a proliferation of the endothelial cells of the reticulum. In hyperplasia of the tonsils there is a proportionate increase in the proliferation of the endothelial cells of the reticulum, and formation of phagocytes, without, however, a corresponding increase in the number of lymphoid cells, or in the endothelial cells of the blood vessels.

In atrophy of the tonsils, the endothelial cells of the follicles are seen first to diminish in number, and endothelial phagocytes are correspondingly few, while the lymphoid cells persist relatively longer. In acute inflammation, the characteristic feature of the process consists of a heightened proliferation of the endothelial cells of the blood vessels, with swelling of their cytoplasm together with an increased number of lymphoid cells. These changes are relatively more marked than the increased endothelial proliferation of the reticulum with follicles. Where circumscribed abscess formation occurs in the follicles, an increased proliferation of the endothelial cells, both of the reticulum and the capillaries, is observable in the vicinity. Where an intense irritant acts upon the endothelial cells of the tonsil, degeneration and necrosis result in the immediate vicinity. At a greater distance proliferation appears to be excited in these cells. It seems, therefore, prob-

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(1) Annals Otol., Rhinol., Laryngol., Nov., 1903.

able that proliferation of the endothelial cells of the reticulum, with a formation of phagocytes, is not necessarily dependent upon the influence of bacterial toxins for its production, but appears rather to stand in a definite relation to the size or activity of the organs in question. Proliferation, on the other hand, of the endothelial cells of the blood vessels was found to occur only in association with other phenomena of inflammation.

H. P. Mosher[1] from examination of a large number of embryos of from four to seven months and of babes at full term, with reference to the tonsil reaches the following conclusions: At birth, both the tonsillar fossa and the form of the tonsil itself are very variable. This is what one would expect after seeing the great diversity of the adult tonsil. Irregularity in the closure of the tonsillar cleft accounts for the greater number of the variations, especially does it explain the occurrence of double or triple tonsillar openings. These multiple openings probably explain the lobulation of the tonsil into two or even three lobes. The tonsillar opening is found to be double in one-fourth of the cases. What might be called the typical tonsil has a vertical axis with an anterior fossa starting from the root of the axis and a posterior fossa which starts back of the axis from the opening of a follicle. The anterior fossa is practically always present. In about half of the cases the posterior fossa is absent. The extent of these two fossæ explains the size and the attachment of the plica triangularis on the adult tonsil, why in one case the plica extends only half way down the front face of the tonsil and why in another case it extends completely round the tonsil to the posterior pillar. The tonsil shares in the general downward growth of the face. At birth the tonsillar opening and the tonsil are practically horizontal. The tonsil at such a time is more a part of the palate than of the wall of the pharynx. Owing to the growth of the face downward the tonsil also grows downward and inward. As a result of this the plica is carried from a horizontal to a vertical position. The supra-tonsillar fossa undergoes a like change of position.

In a very thoughtful article H. L. Swain[2] considers the

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(1) Laryngoscope, November, 1903.
(2) American Journal Medical Sci., July, 1903.

tonsils in their relations as parts of the lymphatic system. A case is described in a man of 63 in which the tonsils became enormously enlarged several times during two years, each time, until the last, yielding readily to Fowler's solution internally and mild astringents locally. Finally general involvement of the lymphatic glands of the system took place and death followed.

Infection from an acute tonsillitis often occurs so suddenly and of such severe degree as to be explicable only on the ground that the infection is poured as it were directly into the lymphatic current and thence to the blood. A case is also cited in a child in which acute inflammation of the pharyngeal tonsil caused high fever and all the symptoms of an acute infection, followed by a condition of general malaise and slight febrile rise at night continuing for several weeks. A consideration of such cases and the logical deductions therefrom leads Swain to say, 'It has become high time that the profession as a whole, and we, all of us, should view the tonsil as not merely an irresponsible, functionless lump of matter existing in the throats of our patients, but as an organ which, if not doing its full physiological duty or if diseased, can modify and influence some of the most vital functions of the lymph and blood. What should be the practical deduction? Surely, it is not to give free rein to indiscriminate attempts at removal of tonsils first, second, or third, and surely it would not argue that we must let them alone. It seems to me the practical point is that when we operate, to be thorough in what we do, and when it is done, be it ever so thoroughly, it must still be borne in mind that we have some tonsillar tissue left.' As tonsillar tissue is normal to the human body, therefore, the patient thus operated upon has all the chances that a normal tissue always has of becoming infected or diseased. We have, therefore, not given our patients immunity because we have operated; we have only given them less liability, and we should, in the line of what we are now saying, never dismiss patients as needing no further thought, because, forsooth, they have received our skilful manipulations in the nasopharynx or pharynx. Surely, there is a broad field for progressive work along the lines of strengthening the bulwarks which nature has endeavored to erect that there may not happen to the little people in our charge some of these dire disasters, which have been mentioned in the early part of the paper, as coming from trifling affections of the tonsils. How can these be avoided? At present the way does not always seem quite clear, but it will never be if we do not occasionally ponder over the matter and endeavor to clear as much of the mist of doubt as is permitted to us, each in his own way and time."

Tonsillitis. Complications. A somewhat rare complication of acute tonsillitis is an acute inflammation of the thyroid gland. W. Lublinski[1] records four cases of this complication observed by him in the past ten years. The patients were all women, varying in age from 20 to 30 years. All had been previously entirely free from any disease of the thyroid. The course of the tonsillitis was not severe in any case and was followed on the fifth or sixth day by a marked swelling of the thyroid with a slight rise in temperature and much pain. The pulse was quickened and remained so after the decline of the fever. There was no suppuration in any case and the swelling gradually disappeared, in two cases after 14 days, in one after 4 weeks and in the fourth after 8 weeks. The author was only able to find one similar case in the literature, that of Quervain, and in this also resolution occurred without suppuration. Lublinski used ice internally and externally for the angina and followed up the same treatment for the thyreoiditis until the pain and fever disappeared. Later a mild iodin ointment was used.

The connection of *appendicitis* with disease of other organs and, especially with diseases of the upper respiratory tract—particularly with angina tonsillaris—has been noticed by several observers. H. Weber[2] reports two cases in which an angina was followed by appendicitis. The probable explanation in the author's opinion is that the irritant reaches the appendix from the throat through the digestive tract. The region of the appendix forms a favorable nidus for germs because of the frequent irritation and injury from the retention of feces. The micro-organisms which especially excite appendicitis, viz., the influenza bacillus and the streptococci, are frequently the cause of angina.

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(1) Berliner klinische Woch., Oct. 12, 1903.
(2) Muenchener medicinische Wochenschrift, Dec. 30, 1903.

Vincent's Angina. E. Conrad[1] reports three cases of Vincent's angina with microscopic and bacteriologic examination. He reviews the present state of knowledge of the disease. Vincent's angina presents the appearance of a diphtheritic membranous tonsillitis, showing a grayish-white membrane with red, inflamed borders which usually occupies one tonsil, spreads gradually in width, and may remain superficial or may give rise to deep ulcerations, sometimes funnel-shaped, sometimes with a honeycombed base. The disease may spread to the opposite tonsil, to the soft palate or the gums and mucous membrane of the mouth. It is accompanied by swelling of the lymph glands, by various constitutional symptoms, sometimes by considerable fever. It is caused by a peculiar fusiform bacillus which is found sometimes alone, but frequently in the superficial layers mixed with other bacterial forms and frequently accompanied throughout the extent of the lesion by spirilla which seem to be identical with the spirochætæ found in the mouth of healthy people, especially under conditions of bad oral hygiene. It seems evident that mixed infection increases the severity of the disease, probably by heightening the virulence of the fusiform bacteria. The infection is favored by youth, the male sex, tobacco, development of wisdom teeth, caries of the teeth, syphilis, mercurial stomatitis, and lack of care of the mouth. The diagnosis is to be made by bacteriologic examination of the false membrane and the distinction must be made between Vincent's angina and diphtheria or syphilis. Microscopic examination after staining with carbolfuchsin will in many cases reveal the characteristic flora of Vincent's angina but diphtheria cannot thereby with certainty be excluded as the two infections may coexist. Syphilitic ulceration may be suspected when the ulceration is of long standing and resistant to treatment. Chauffard thinks that Vincent's angina can be excluded if the disease does not yield quickly to the application of powdered methylene blue. The two diseases may coexist.

The prognosis is favorable; complications are seldom troublesome. Various forms of treatment have been proposed. Cauterization with chromic acid, iodin, chlorid of

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(1) **Archiv für Laryngologie, B. xiv, H. 3.**

lime followed by gargling with solution of resorcin and borax has been recommended as well as application of powdered methylene blue. Change of air and occupation is very desirable and sometimes sufficient to effect a cure.

Peritonsillar Abscess. F. C. Cobb,[1] discussing peritonsillar abscess, gives the results of his researches on the anatomy of this region. He believes the usual seat of the abscess is neither in the pharyngo-maxillary fossa nor the supratonsillar fossa, but in the areolar tissue about the tonsil. He advocates an upward and backward incision with a straight knife when the pus is evidently in the antero-superior region, while in the postero-superior cases an outward incision between posterior pillar and tonsil, with a right-angled knife is advised. When the pus is evidently directly external to the tonsil it is perhaps advisable for the non-expert to wait a day or two in order to allow the pus to push anteriorly or posteriorly and thus permit a safer incision.

Complications. Dr. Brindel[2] divides the complications of tonsillar abscess into four groups: (1) those due to general infection among which are included, infectious joint disease, ulcerative endocarditis, septico-pyemia, collapse, and general convulsions; (2) those due to local infection such as diphtheria, unilateral paralysis of the soft palate, of the muscles of the neck and of the epiglottis; (3) those due to mechanical obstruction of the throat or of the respiratory passages by escaping pus; (4) those due to the extension of the suppuration to the neighboring organs, particularly the blood-vessels. Of 22 cases of vascular complications of tonsillar abscess 16 were due to opening of the carotid, one to the formation of an aneurism, and five to the production of phlebitis of the veins of the neck. These complications are found most frequently in abscesses which are allowed to take their course and open spontaneously. The abscess takes from five to seven days to find its way to the surface, it opens by a tortuous path and the result is a retention of pus in the organism, in a dangerous region surrounded by important organs which adapt themselves badly to the neighborhood of pus. The abscess should be opened freely and as early as possible, even if only a few drops of pus are found. The best instrument for the purpose is the galvanocautery, which is rapid, comparatively painless, checks hemorrhage, and assures a free opening. If we have to do with a peritonsillar abscess, with deep suppuration, not prominent in the throat, but causing much swelling of the neck, the proper course is to open through the skin with the bistoury.

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(1) Annals of Otol., Rhinol and Laryngol., March, 1903.
(2) Journal de Médecine de Bordeaux, Aug. 2, 1903.

Tuberculosis. A case of primary tuberculosis of the tonsil in a babe 15 months old is reported by H. Koplik.[1] The child had been a good deal with its grandfather, who was suffering from tubercular lung disease. There was no sign of disease of any other portion of the respiratory tract until after removal of the tonsils and adenoids. The cervical lymph glands were much enlarged and were removed a month after the operation on the tonsils. The lungs and larynx now became involved and death occurred from pulmonary tuberculosis seven weeks after the last operation. Koplik reports two other cases in which it was quite evident that infection entered through the tonsils. In one, a girl of 12, the infected cervical lymph nodes were removed with apparently perfect recovery. In the other, a boy of eight, tubercular meningitis and death followed the tonsillar infection. He concludes that while the tonsil may be the seat of primary tubercular infection, such a condition is very rare as compared with the pyogenic forms of infection.

Operation. The indiscriminate removal of enlarged tonsils is deplored by L. H. McGavin,[2] who advises reduction by cauterization. He considers tonsillectomy indicated in the following conditions: 1. Where the whole tonsil is extensively diseased. In such a case the subsequent fibrosis induced by such extensive use of the cautery as would be necessary is liable to leave the tonsil disorganized and often in a chronically painful condition. 2. When the crypts involved, although few in number, are situated at the upper part of the tonsil and open upon the mouth of a deep supratonsillar fossa. It is in such cases that cauterization is useless, many of the crypts being out of reach and the fossa acting as a trap for secretion and food particles which

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(1) American Journal Medical Sciences, November, 1903.
(2) Lancet, Sept. 26, 1903.

rapidly decompose. 3. When the crypts, although few are involved, occur upon a hard, anemic, and rugose tonsil, and contain lacunar plugs which are cretaceous and extremely foul. Such tonsils are the result of old-standing hyperplasia and are quite unsuited to treatment by the cautery. 4. When the disease occurs in young children who will rarely permit of any prolonged manipulation in the mouth. 5. When the condition is accompanied by cervical glandular enlargement. 6. Where cauterization has already been tried and has failed. On the other hand, dilatation of the orifices, evacuation of the contents, and cauterization of the crypts is especially indicated—(1) in cases where the diseased crypts are neither numerous nor large; (2) where the upper part of the tonsil is healthy and the supratonsillar fossa is shallow; and (3) where the disease occurs in young adults and has not been of long standing.

[The Editor has found that practically any tonsil, no matter how large, can be quite satisfactorily reduced in size by galvano-puncture, smaller tonsils in three to five sittings, larger ones in from five to ten sittings. Of course, in the case of the larger tonsils, removal by tonsillotome or snare is far preferable, but where the objections on the part of the parents to any cutting operation are insurmountable, the cautery may be used with assurance of satisfactory success.]

H. L. Myers[1] prefers the cold snare for removal of the tonsils even in children. He brushes the tonsils with a 10 per cent solution of cocain two or three times, waits a few minutes for anesthesia to occur, then adjusts the snare and excises the tonsil with as quick a movement as possible. In adherent or flattened tonsils the adhesions are broken up and the tonsil pulled out with a tenaculum or forceps until the snare is adjusted and tightened. He has never had severe hemorrhage.

W. H. Peters[2] again describes his tonsil snare. With this he claims it is possible to remove both tonsils at one sitting in a child with very little loss of blood, thus making it safe to remove the pharyngeal tonsil immediately after. He uses chloroform for the operation in children.

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(1) Laryngoscope, March, 1903.
(2) Laryngoscope, November, 1903.

While one may get severe hemorrhage after the use of the snare, yet such an occurrence is rare. Peters has used the instrument for sixteen years.

Hemorrhage. A. H. Urban[1] reports a case of almost fatal secondary hemorrhage after tonsillotomy in a boy of 7 years. Dangerous hemorrhage after tonsillotomy in small children is extremely rare except in hemophiliacs. In Urban's case the hemorrhage began about 18 hours after operation and continued 7 or 8 hours, when it was checked by the application of the Paquelin cautery to the stump showing the bleeding artery.

[As severe bleeding after tonsillotomy usually ceases if the patient faints, it has been suggested to anticipate Nature's method by the use of veratrum viride. In a recent case of the Editor's, in a young woman of 20, immediate success followed the hypodermic use of ten minims of tincture of veratrum viride after a number of other remedies had been used without effect.]

Gangrene. C. W. Richardson[2] reports a case of gangrene of the tonsil in a man of forty-five of robust physique but addicted to excesses. An attack of tonsillitis followed an alcoholic excess and the patient was treated for diphtheria, receiving 16,000 units of antitoxin. The author saw the patient two hours before death. The right tonsil, anterior and posterior pillars and the visible pharynx were involved in the slough. Richardson believes the attack began with a quinsy, a streptococcus infection probably. The patient was sick about ten days. A. C. Howe[3] reported a very similar case in a man of twenty-six. This patient was also addicted to excesses, venereal and other. The tonsil sloughed out and the process extended deeper, but was finally brought under control. Three months later the patient died from gangrene in the nose, the result of intranasal packing for epistaxis.

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(1) American Medicine, July 4, 1903.
(2) Laryngoscope, November, 1903.
(3) Philadelphia Medical Journal, March 17, 1900.

ESOPHAGUS.

Stricture Following Typhoid Fever. M. L. Turner[1] reports three cases of this complication, two of which were spasmodic and one organic. The spasmodic cases were readily relieved by treatment directed to the nerves while the organic stricture yielded only to prolonged dilatation with bougies.

Esophagoscope. M. Einhorn[2] presents a new esophagoscope. Figs. 31 and 32 show the instrument and its use. The patient's head is thrown well back, the tongue drawn forward, the instrument, with the obturator in place, is dipped in warm water and passed steadily downward. The instrument in place the obturator is removed, the current turned on and the mucous membrane of the esophagus observed as the instrument is slowly withdrawn.

LARYNX.

Epiglottis. Operation. Removal of the epiglottis on account of obstruction to breathing caused by its enlargement has been reported a number of times. The operation is usually done by an external operation, but T. R. Chambers[3] recently removed the epiglottis by a cutting forceps through the mouth. The operation was done for enlargement due to lupus and gave complete relief. E. F. Potter,[4] London, removed the epiglottis in a case of cancer, for relief of severe pain which greatly interfered with the patient's eating. The operation was done with the cautery snare under cocain anesthesia and afforded the patient great relief. Richard Lake has done the same operation for the same purpose in cases of tubercular laryngitis. The operation is thoroughly justifiable for the relief of these hopeless cases rendering them much more comfortable and prolonging life.

Acute Laryngitis. H. H. Curtis[5] discusses the acute

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(1) Iowa Medical Journal, November, 1902.
(2) Berliner klinische Wochenschrift, Dec. 22, 1902.
(3) Laryngoscope, February, 1903.
(4) Laryngoscope, June, 1903.
(5) Laryngoscope, April, 1903.

laryngitis of singers and presents his method of treatment. Almost invariably in voice users a slight paresis accompanies almost every acute affection of the larynx, which is called a laryngitis. The patient almost always presents

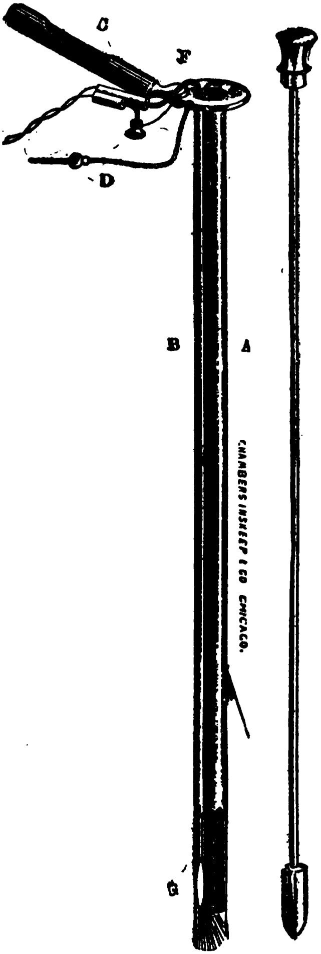

Fig. 31. Einhorn's Esophagoscope.

himself struggling to speak in a loud tone with a very husky voice. The *sine qua non* of treatment must at once be exacted, viz., absolute silence, or a tone whispered on the lips with no laryngeal quality in the voice. This must be enjoined until the sound written *humph,* may be made without effort through the nose, the mouth being closed. Then vocal exercises are to be commenced, using words like *ming, mong, ding, dong, maw, mow,* etc., as an adjunct to treatment; for at that moment it is known that the thyroarytenoids and other affected muscles have lost their paresis, if it existed, and have regained their tonicity. The instant innervation is re-established, then muscular exer-

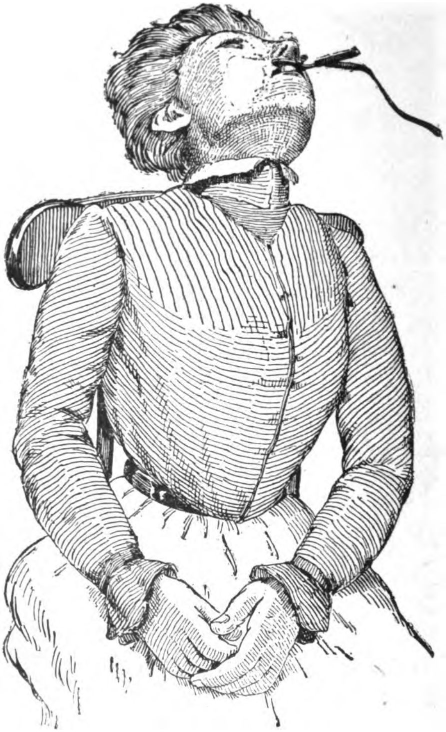

Fig. 22. Einhorn's Esophagoscope in Position.

cises to overcome the slight infiltration present are to be commenced. Internally, from the first, strychnin is given and static or faradic electricity is applied along the course of the recurrent laryngeal nerves. Of greatest value in this stage is the use of adrenalin chlorid solution sprayed into the larynx before doing the tone exercises.

While carefully exercising the sluggish intrinsic muscles by using with the nasal attack, words beginning with the labial consonants, as exemplified by humming the word *ming,* it is well to alternate the work by giving a massage to either side of the trachea and thyroid as well as under the ramus and angle of the jaw. The latter is performed by standing in front of the patient, separating the first and second fingers, applying them over the region of the inferior maxillary glands and making rapid backward and forward movements, pressure being directed upward and inward. The tracheal and laryngeal massage is done upward and downward with the thumb and two fingers. A cold pack is then applied to the throat and the pyriform sinuses are swabbed with tincture of iodin and glycerin in equal portions, to stimulate the nerves and produce a counter-irritation without the vocal larynx. This method of procedure will quickly abort a commencing laryngitis. Of course attention must be paid to nutrition and elimination, and the respired air must be cool and pure. After a laryngitis has been relieved in this manner a spray of adrenalin (1—5000) should be used during a performance, alternated with an inhalation of menthol in albolene (5 to 10 grains to the ounce), or an inhalation of iodoform in ether.

This treatment is only attempted when demanded by the special emergency of the individual case, but Curtis states that he has saved many a performance by its use and he considers it the simplest and best.

Laryngeal manifestations of influenza are found under four forms, according to E. J. Moure:[1] a. The catarrhal form; b. The infiltrated edematous form; c. The ulcerative form; d. The myopathic form.

For local treatment the author uses an inhalation from a pint of hot water containing a teaspoonful of tincture of

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(1) Journal de Médecine de Bordeaux, Feb. 15, 1903.

eucalyptus which holds 2 per cent of menthol and of balsam of Peru and 1 per mille of thymol. Hot fomentations around the neck are very useful in painful congestive forms. Galvanism or scarification of the edematous parts may be necessary, but in general the pain and swelling can be relieved by the following used as a spray:

Cocain mur., gr. 4 to 7½; Sol. adrenalin, (1 to 1000), m. 75; antipyrin, dr. 1; Glycerin, Aq. menth. pip., aa. dr. 12; aquæ, oz., 12½. Later when the infiltration has disappeared, good results may be had from application of solution of silver nitrate, or chlorid of zinc, 1/100 or 1/50 or even 1/30.

Rheumatism. E. Baumgarten[1] describes a case of rheumatism of the crico-arytenoid joint in a man of 40. The pain was great and the laryngoscopic appearance led to a diagnosis of syphilitic perichondritis, the patient giving a history of infection many years previous. This led to the administration of potassium iodid, but the sudden disappearance of all laryngeal symptoms a few days later and the development of rheumatism in other joints cleared up the diagnosis. The symptoms of rheumatism of the crico-arytenoid articulation are, hoarseness, severe pain in speaking, more or less dysphagia and dyspnea if both sides are affected. The latter symptom may even be so urgent as to indicate tracheotomy. The laryngoscope shows redness and swelling involving the arytenoids and the aryepiglottic folds. The appearance and symptoms are not characteristic enough to warrant a diagnosis except in the presence of rheumatism elsewhere in the body or the sudden coming and going of the symptoms.

Simple Ulceration. W. C. Phillips[2] records a case of simple catarrhal ulceration of the vocal cords which was under his care during twelve years. The patient was a robust man of good history with no local disease except a slight nasopharyngitis and a large septal spur. The ulceration was one-fifth inch in diameter with blood vessels radiating from it. The condition seemed to result from a simple cold, the patient having five attacks in the twelve years and recovering only on going South each time. Two

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(1) Wiener medizinische Woch., Oct. 17, 1903.

(2) Annals of Otol., Rhinol. and Laryngol., November, 1902.

or three weeks sufficed for cure in a mild climate. The septal spur was removed after the first attack, but this seemed to have no effect in preventing recurrences. The author gives the histories of two cases of much the same nature occurring in the practice of J. A. Kenefick. Some authorities question the occurrence of such cases, but Phillips' case seems to be unquestionable.

Herpes. Bettmann[1] adds another instance to the few reported cases of laryngeal herpes, which possesses the added interest that it is also a case of menstrual herpes. The eruption occurred at the time of menstruation and was accompanied by a herpetic eruption on the left side of the neck under the lower jaw. This eruption appeared regularly one week before the menstrual period and affected the lips, usually on the left side of the face. While other previously described cases of herpes of the larynx have been traceable to infection, this one must be referred to reflex irritation. Menstrual herpes usually appears on the lips and on the external genitals, but it may be localized in other parts, always, however, appearing on the same spot in the same individual.

Edema of Glottis. J. C. Gittings[2] reports a case occurring in child aged 5 years following an attack of scarlet fever. The rash was slight, but there was a small patch of membrane on one tonsil. The membrane disappeared in three days. Adenitis of the cervical glands of one side resulted in an abscess, which was opened. Six days after disappearance of the patch from the tonsil dyspnea began and rapidly became severe. Antitoxin was now used and treatment given as for membranous laryngitis. Intubation was done, but as the tube gave no relief it was removed after ½ hour. Careful examination of the case by Gittings and J. H. Jopson and the subsequent course of the disease led to a diagnosis of edema of the glottis. The child had suffered from Pott's disease of the lower dorsal and upper lumbar vertebræ for two years previous to the scarlet fever.

From a study of the literature of the subject Gittings reaches the following conclusions:

I. Simple edema of the larynx usually occurs in

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(1) Berliner klinische Wochenschrift, Sept. 8, 1902.
(2) New York Medical Journal, July 25, 1903.

cachectic diseases, especially of the heart and kidneys. In these there may be no apparent exciting cause, and the inflammatory symptoms are conspicuous by their absence.

II. Inflammatory edema of the larynx results from contiguity to other inflamed structures; as a local complication of the acute infections of erysipelas, variola, measles, scarlatina, influenza, etc.; or as a result of severe grades of inflammation in simple acute laryngitis. Bacteriologic investigation will probably find that a streptococcus is the most frequent exciting cause.

III. Traumatism to the laryngeal structures may result in edema, depending on the degree of "insult" to the tissues or to a possible predisposition.

IV. Among rare causes of edema of the larynx are angioneurotic disorders and the blood dyscrasiæ, such as scurvy, purpura, etc.

V. The diagnosis rests on the evidence of palpation and, if possible, visual examination, as well as on the signs of laryngeal obstruction. Membranous laryngitis cannot always be at once excluded.

VI. Prognosis is unfavorable in all cases occurring in the course of chronic cachectic diseases and in severe types of the acute infectious diseases. In no case can it be other than guardedly favorable.

VII. Treatment by intubation rarely affords relief unless the obstruction is infraglottic. Tracheotomy is absolutely demanded in extreme cases. The continuous inhalation of medicated steam is always to be employed; scarification and external depletion by leeches may be tried; cold and heat should be used externally and internally—cold as a prophylactic and heat as a stimulant and absorbent. General stimulating and supportive measures are necessary in all cases.

With the occurrence of edema of the larynx the time of election for the use of antistreptococcic serum has probably passed. As the infection is usually a mixed one, serum therapy does not at the present time offer much prospect of relief, and its use must be empirical unless there is opportunity for bacteriologic diagnosis from cover-glass preparations.

Angioneurotic Edema. J. Garel and S. Bonnamour[1] conclude an exhaustive review of this subject as follows:

1. There exists an angioneurotic edema of the larynx, a special localization of Quincke's disease.
2. Alternation or coexistence of this edema with other manifestations of the same nature upon other mucous membranes or upon the skin of various parts of the body, heredity, and extremely rapid development are the three characteristics of this affection.
3. Fever and albuminuria may occur but their duration is as short as that of the edema.
4. Recovery is the rule. Death, however, may be the result; in this case asphyxia is marked, sudden, giving no time to prepare for it.
5. Local therapy has, therefore, no effect. In some rare cases, however, resort may be had to intubation or tracheotomy.
6. The pathogeny may be summed up as a peripheral excitation of a predisposed larynx, with reflection upon the central nervous system and the vasomotor centers, and the coexistence of gastrointestinal autointoxication.
7. While related to urticaria of the larynx, angioneurotic edema of the glottis is distinguished by the complete absence of redness, of urticarial spots on the skin, and especially by the lack of itching.
8. Angioneurotic edema of the glottis is always preceded, accompanied, or followed by other edemas of the mucous membranes or of the skin. Cases described under this name by some authors, in which the edema was confined to the larynx, can not be included in this category, but must be referred to a special class: idiopathic edema of the larynx.

Perichondritis. E. Mayer[2] discusses the subject of perichondritis of the larynx due to typhoid fever. Eight cases have been reported in recent American literature, of which, four died, two recovered completely and two still wore a tube at time of report. Mayer reports a case in a woman of 28 who had been one month convalescent from a severe attack of typhoid when such great laryngeal swelling oc-

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(1) Annales des maladies de l'oreille et du larynx, July. 1903.
(2) Medical Record, July 25, 1903.

curred as to demand immediate tracheotomy. Contraction of the larynx takes place in these cases during healing and renders dilatation necessary. Mayer used Schrötter's tubes for this purpose and later inserted an O'Dwyer tube, which remained *in situ* three weeks later at the time of the report. The author expects a complete cure in his case.

Congenital Diaphragm of the Larynx. To the eighteen cases of this deformity so far reported P. Fraenckel[1] is able to add two more. This very rare anomaly consists in the presence of a membrane which extends from the anterior commissure of the vocal cords along the free edge of these structures reaching about half way across the glottis as a rule but varying in extent from a membrane extending the whole length of the opening to about one-third. The membrane is thin at its posterior border but grows thicker as it passes forward. In two cases (Chiari, Harmer,) it has been found at the posterior part of the opening, becoming thinner and ending in a concave border in front. Double membranes have been observed. The anomaly may produce hoarseness, and sometimes gives rise to difficulty in breathing, but often no effect is produced and it is discovered at autopsy or by accident. There is some reason to believe that hereditary influences play some part in its causation. The deformity is sometimes associated with other congenital defects.

Nervous Affections. H. Caboche[2] reports a case of *chorea* in which the muscles of the larynx were affected with choreic movements at the same time with those of the trunk and the limbs. The muscles of the face were not affected. The patient exhibited paroxysms of hiccough in which particles of food were frequently ejected from the stomach. There were fibrillary contractions of the tongue, a considerable restriction of the field of vision, and other hysterical manifestations. The laryngeal symptoms consisted in a peculiar modification of the voice, which was sometimes varied in pitch, passing from a very high to a very low pitch between consecutive words so that there would be several abrupt changes of pitch in a short sentence. The sentence often ended in an abrupt explosion of

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(1) Deutsche medicinische Wochenschrift, Dec. 18, 1902.
(2) Annales de maladies de l'oreille et du larynx, October, 1902.

sound. These paroxysms were invariably accompanied by an electric discharge causing choreic movements in the muscles of the limbs or of the trunk. Laryngoscopic examination showed the vocal cords very pale, without a trace of catarrh. During respiration instead of remaining in repose in abduction, or passing through a slight movement of adduction at the end of expiration as in the normal condition, they were seen to oscillate continually between the position of moderate adduction and abduction, suddenly to approach each other with a violent movement of adduction and immediately to separate. The patient had no cough. The throat and nose were normal. She slowly improved under treatment by bromids, valerianate of zinc and faradism to the larynx.

Under the name of laryngeal chorea cases of nervous cough have frequently been included, but it is the opinion of the author that such cases are not properly to be considered as choreic. Chorea confined to the laryngeal muscles is almost unknown, while Luc could collect only six cases of true chorea of the laryngeal muscles in combination with choreic movements in other parts of the body.

Recurrent Paralysis. Paralysis of the recurrent laryngeal nerve with resulting aphonia is most often due to pressure from aortic aneurism or esophageal carcinoma. Unless a laryngoscopic examination is made the hoarseness in such a case is likely to be attributed to inflammatory changes in the larynx itself, and it is quite usual to find that a patient has had prolonged local treatment before a proper examination has been made and the cord paralysis discovered. O. Joachim[1] reports a case in which pressure on the recurrent nerve was *due to an esophageal abscess following stricture.* In this case there was inequality of the radial pulse, the left being appreciably smaller than the right. This sign of course pointed strongly to aneurism, but the uncertainty of other signs left the cause in much doubt until it was revealed by autopsy. The pressure on the left subclavian artery was found to be due to a large abscess in the apex of the left lung—a metastasis probably from the esophageal abscess. The patient's history was

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(1) **Annals Otology, Rhinology and Laryngology, June, 1903.**

negative as to syphilis and no tuberculosis was found. The cause of the stricture could not be determined.

Abductor Paralysis. A. H. Urban[1] records a very interesting case of bilateral abductor paralysis of the larynx in a boy of 15 following an attack of diphtheria. The paralysis occurred three weeks after the attack of diphtheria and three weeks later, just after entering the hospital, the dyspnea became suddenly so much worse that a hasty tracheotomy and artificial respiration became necessary. Notwithstanding the use of the usual medicinal and other treatment recovery had not taken place three and one-half years later. With paralysis of the abductors the glottis is kept constantly closed by the adductors and in any such case the patient is in constant danger of asphyxiation. Such a patient should be kept under the closest supervision or better, a tracheotomy done as soon as the condition is fully developed, since death may occur suddenly when surgical aid is not at hand.

L. B. Lockard[2] describes three cases showing an abductor paralysis of one of the cords as an *early symptom of tabes dorsalis.* The paralysis was detected in these cases from 7 to 22 months before any other tabetic symptoms could be detected.

Tuberculosis of the Larynx. W. F. Chappell[3] writes of the difficulties attending the diagnosis of atypical cases of tuberculosis of the upper air tract, especially if the disease be primary in these localities. Recurring and persisting hyperemias, infiltrations and tumefactions are the most usual and characteristic signs of early laryngeal tuberculosis. They appear as patches or may involve the whole interior of the larynx. The interarytenoid space, ventricular bands, posterior third of the vocal cords and epiglottis are the usual places for early circumscribed infections. While the presence of these conditions necessarily awaken anxiety and necessitate careful observation, yet any or all may be present as the result of simple cold, rheumatism or voice strain and may persist at intervals for years.

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(1) Buffalo Medical Journal, November, 1903.
(2) Annals of Otol., Rhinol. and Laryngol., March, 1903.
(3) Journal American Medical Association, Feb. 21, 1903.

In the early stages soothing sprays and warm inhalations followed by mild astringents should be employed. In ulcerative conditions when the general disease is active Chappell relies entirely on soothing and cleansing sprays and applications of iodoform and fluid benzoin. When the general condition is quiescent he applies 25 per cent lactic acid or a creosote solution. In the intermediate stage of congestion and thickening submucous injections of lactic acid or creosote are advised. Curettement is advised against except in very rare cases, and this agrees with the opinions expressed by a number of members of the Laryngological Section (American Med. Assoc.), who discussed the paper.

After experiencing a number of unpleasant results from the use of the curette, Chappell now employs it only for the relief of dyspnea and dysphagia in advanced cases; for removal of tumefied tissue and for scraping ulcers (dull curette, no hemorrhage produced) during a quiescent period.

Orthoform is generally used for the relief of pain, cocain being unnecessary except perhaps in extreme cases. C. H. Baker in the discussion stated that for the relief of the distress in the tumefied condition before ulceration occurs he had found the best local application to be ichthyol in emulsion, in oily solution or watery solution. This often causes marked improvement without other local treatment. Various speakers cited instances of cure of very severe laryngeal tuberculosis and all were inclined to the belief that these cases should be looked on more hopefully.

C. F. Theisen[1] records a case of *hypertrophic tuberculosis* of the larynx in a man 40 years old in which the laryngeal disease seemed to be primary, although it is not reported as such. The author makes the following classification of these cases: Class I. Cases in which the characteristic changes in the larynx consist of either a marked hypertrophy or hyperplasia of the tissues, or in which tumor-like formations *without* ulceration occur. Class II. Distinct tumors, usually covered with intact mucous surfaces, and called by the French the "type d'Avellis," which seem frequently to originate in the ventriculus Morgagni. These tumors may or may not be pedunculated.

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(1) American Journal Medical Sciences, November, 1903.

This form of laryngeal tuberculosis is very rare. Theisen gives abstracts of reports of 17 cases of the first class and 23 of the second which have appeared in the literature. A mistake in diagnosis is easily made, the disease being mistaken for pachydermia laryngis, syphilitic gumma, lupus and malignant growth. Early diagnosis is as important as in other tubercular disease, so that the patient may be given a climatic change, which is the only treatment considered by the author.

J. Horne[1] states that in closely following the necropsies of a large general hospital for ten years he has not met with a case of primary tuberculosis of the larynx. From a very large deadhouse experience he feels justified in saying: 1. When the larynx is infected with tubercle the disease is already established in the lungs. 2. That by the time the disease in the larynx has advanced to ulceration the disease in the lung has advanced to cavitation. 3. When the disease in the lung is confined to the pure miliary form the larynx is never infected. From these statements the obvious deduction is that infection of the larynx takes place by the sputum. Fig. 33 shows what Horne calls the vulnerable spot of the larynx; it begins behind the vocal process and passes obliquely upwards and backwards to the summits of the cartilages of Santorini and Wrisberg. Here where secretion may rest and stagnate and where stress and strain is put upon the laryngeal mucosa a breach in the inflamed surface can readily occur and various infections find lodgment and entrance.

L. B. Lockard[2] expresses his belief that the treatment of tubercular laryngitis should usually be the same as that addressed to tuberculosis of the tongue, bones or skin—complete removal of the affected parts at the earliest possible moment, provided a previous conscientious trial of the more conservative methods has been given. He records four cases operated on six years ago which have remained cured, and has a number of other patients operated on since that time who have remained well, but in whom not more than two years have elapsed since operation. In diffuse infiltrations and ulcerations of the posterior wall and

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(1) British Medical Journal, Oct. 31, 1903.
(2) Philadelphia Medical Journal, April 18, 1903.

aryepiglottidean folds with dysphagia not controllable by other means he practices division of the pharyngolaryngeal wall. The operation is done with angular scissors under cocain anesthesia. If the epiglottis is the source of pain it should be removed. Tracheotomy is indicated in threatened asphyxia from edema, perichondritis, abscess or subglottic swelling. It is also indicated in severe laryngeal tuberculosis with slight pulmonary involvement.

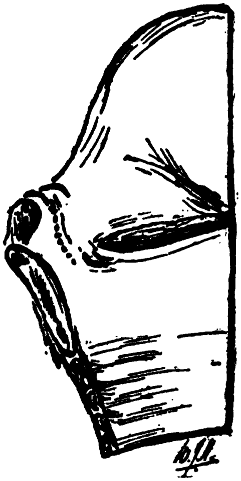

Fig. 33. Diagram of the Interior of the Left Half of a Larynx to Show the Site Referred to as the Vulnerable Spot, Which is dicated by a Dotted Line.

As an illustration of the good results sometimes to be secured from *tracheotomy in laryngeal tuberculosis* a case reported by Price-Brown[1] is instructive. The patient, a man of 30, suffering from a tuberculosis of both apices, developed a laryngeal tuberculosis of marked degree. Tent life in the woods greatly improved the lung condition, but in 18 months the larynx had grown so much worse that tracheotomy was necessary to prevent suffocation. After tracheotomy the patient continued to live outdoors, the lungs seemed to be practically healed and the larynx so

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(1) Annals of Otology, Rhinology and Laryngology, June, 1903.

much improved that the author hopes to be able to dilate the glottis sufficiently to allow removal of the tracheal tube. Price-Brown considers the case an unusual one and would not advocate tracheotomy under such circumstances unless the lung conditions were very favorable.

E. R. Johnson[1] reports several cases successfully treated by local application of a 2 per cent solution of *formalin* (which would mean an .8 per cent formaldehyde solution) in water. The applications were made three times a week.

Maget and Planté[2] have had encouraging results in the treatment of tuberculosis of the larynx and other microbic affections of the respiratory organs from the use of the *vapor of hydrogen dioxid.* They find that the vapor from boiling solutions of hydrogen dioxid still contains enough oxygen to act as an efficient *antiseptic.* It is non-irritating and can be inhaled with impunity.

Laryngeal Tuberculosis at High Altitudes. In view of the fact that high altitudes have been held by some to be unfavorable to laryngeal tuberculosis, R. Levy,[3] Denver, made a study of 205 of his cases of tuberculosis with reference to this point. A number of tables are constructed and he arrives at the following conclusions: 1. In cases in which both lung and throat lesions develop in Colorado the throat lesion manifests itself 48 weeks later than in those originating elsewhere. 2. In cases in which lung lesions develop elsewhere and throat lesion in Colorado, the throat lesion manifests itself 62.3 weeks later than in those originating elsewhere.

Tuberculosis of the Larynx in Pregnancy. Tuberculosis of the larynx is a rather rare complication of pregnancy, but N. Godskesen[4] has been able to find 48 cases in the literature and reviews the subject. Laryngeal tuberculosis frequently develops during the course of pregnancy or it may be a part of a general tuberculosis of the lungs existing before the pregnancy. This is, however, relatively rare because such patients are usually in such an advanced state of the disease that their general weakness prevents conception. Laryngeal tuberculosis adds materially to the un-

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(1) New England Medical Gazette, October, 1903.
(2) Annales des maladies de l'oreille et du larynx.
(3) New York Medical Journal, Nov. 1, 1902.
(4) Archiv für Laryngologie, B. xiv, H. 2.

favorable prognosis of pregnancy complicated by consumption and even when it is the sole manifestation of the tuberculosis the prognosis is bad. The march of the disease generally becomes more rapid after delivery and leads to death in a short time. The prognosis is decidedly more favorable in those cases in which the tuberculosis of the larynx is in the form of a limited tuberculous tumor which can be completely extirpated.

Tracheotomy is a measure of some advantage and the results indicate that it would be better not to defer it until the stenosis of the larynx is so great as to threaten life. Laryngotomy and splitting of the larynx are less used and promise little, although occasionally they are very successful. They are usually more successful when preceded by a tracheotomy. Subhyoid pharyngotomy may be resorted to when there is great difficulty of swallowing.

A very important question in connection with the relations of laryngeal tuberculosis and pregnancy relates to the propriety of inducing abortion in the early months of pregnancy. This should be done as early as possible and with a full knowledge of all the conditions. The early diagnosis of laryngeal tuberculosis is therefore of great importance and the practitioner should pay particular attention to any laryngeal symptoms which arise in the course of pregnancy and should avail himself early of the aid of skillful laryngoscopic examination.

The prophylaxis requires that pregnancy should be avoided in subjects who have or have had laryngeal tuberculosis. There are some cases of completely healed laryngeal tuberculosis in which pregnancy has occurred without relapse. These, however, can afford no justification for the neglect to warn against the danger of pregnancy in similar cases.

Fibrosis. R. W. Seiss[1] says that laryngo-tracheal fibrosis may be regarded as the final stage of every case of progressive chronic inflammation of this region. We know practically nothing of the etiology of sclerosis in this, or indeed in any other region of the body. Its causes originate far back in the molecular life of the individual, and are at present absolutely unknown. The *pathology* of the

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(1) Journal Am. Med. Assoc., April 18, 1903.

disease is that of fibroid degeneration of tissues in general; the slow migration of leucocytes, their aggregation and subsequent fibrillization into new connective tissue, the atrophic changes due to pressure which necessarily follow. Proliferation of the epithelia may be so pronounced that marked papilla are formed, and these inflammatory papillomata, which usually appear late in the history of chronic laryngitis, are the small laryngeal warts which come on in middle life. This is also the pathogenesis of the pachydermia laryngis, of which so much has been written; the proliferated squamous epithelium being piled up in plates and nodes on the fibrosed submucous tissue.

Symptoms. The clinical history of the disease is that of long-continued pharyngo-tracheal annoyance, consisting in the early stages of the usual symptoms of ordinary acute, subacute and chronic inflammation in the upper respiratory tract. As fibrosis becomes well established a different train of symptoms begins. Most characteristic is vocal weakness, pure and simple, not due to the presence of mucus or to local swelling, or erosion of cords, but to pure inability to use the larynx in a normal manner for longer than a few minutes at a time. The voice is thin and weak, but not at first hoarse; speaking is soon troublesome or painful, annoying cough appears, and rest is demanded. This laryngeal incapacity is undoubtedly due to the general stiffening of the whole larynx, and direct interference with muscular action by the pressure of new-formed fibrous tissue. Slight cough with purely mucous, rarely purulent expectoration, is a constant symptom in laryngo-tracheal sclerosis; it is most marked on waking in the morning, and in early cases may not again appear during the day. Vague but often very annoying, painful sensations about the larynx and trachea are quite constant. They range from mere paresthesia, described as dryness, stiffness, tickling, etc., to a constant sense of weight and pain. Extreme vulnerability to acute inflammatory attacks is one of the commonest signs of sclerotic laryngitis, and is the usual cause of the patient seeking relief. It seems to be present in all cases, and is so marked at times as to practically invalid the subject. Chronic bronchitis is present in about 20 per cent of the cases and where it exists cough and expectoration are usually distressing features. Spasmodic asthma is found to some extent in about 10 per cent of all cases, and fibrosis is more rapid in these than in other subjects. Sclerotic changes may begin in the larynx at any age, but are rare in the young; patients applying for relief are usually in middle life.

Diagnosis. In the laryngoscopic mirror the picture is characteristic, the whole region appears much larger than usual, the larynx capacious and especially easy of examination; the region of the arytenoids and folds are narrowed and thinner than normal, and prominent varicose vessels are often present. The condition of the mucous membrane varies if epithelial changes have been marked, crusting and erosion of the membrane are prominent, but this is less common than the purely interstitial form and the epithelial surface may be but little changed. Any amount of papillation, bosselation or epithelial aggregation may exist, giving the appearances described as pachydermia, the region between the arytenoids is especially apt to show minute papillomata. Very rarely the epithelia may break down over a limited area, giving very shallow erosions or ulcers, but these are by no means characteristic. The trachea is usually very easy of examination by the mirror, and shows widening, yellowish coloration, and often striation, from the characteristic changes. No other throat conditions present appearances in the least similar. The active inflammation and hyperemia of ordinary chronic laryngitis are absent, and the "graying," swollen arytenoids and ulceration of tubercular laryngeal disease are conspicuously absent. The deep red color islets of intense congestion of chronic lithemic laryngitis are not present after fibrosis has well advanced. Ausculation of the trachea and bronchi may show harsh breathing and coarse râles; and cog-wheel respiration is very common.

Treatment. Palliation of the symptoms, possibly arrest of the pathologic process is all that can possibly be secured.

Local applications in the form of sprays or vapors are certainly of benefit; medicines which act as mucous membrane stimulants, but not as irritants, are most efficient. Chloretone, many of the volatile oils, carbolic acid and iodin are most useful; mild alkalies, such as sodium benzoate and borate, are efficient in weak solution for dislodging adherent mucus. All mineral astringents, especially silver nitrate, so long lauded in the treatment of chronic laryngitis, are out of place in this disease, and their use in any condition is exceedingly limited in the practice of the writer. The rather old-fashioned and now much-neglected steam atomizer is especially efficient, and is generally the only apparatus safe to trust to the hands of patients. Internal medication, as far as the laryngo-tracheal disease is concerned, is idle toil, not the slightest good ever having resulted from such treatment, used alone, under the writer's observation.

Massage, our most valuable agent when dealing with sclerosis higher up in the air passages, can scarcely be used even in the upper regions of the larynx, but may be cautiously attempted in very tolerant subjects. Faradism is of distinct value, the positive pole against the pharyngeal mucous membrane, and the negative over the sternum or held in the patient's hand, is the usual method of employment. A combination of external massage with faradization is very beneficial, one pole being held by the patient, the other by the surgeon, while with his other hand the latter carefully palpates the whole exterior of the larynx. Exercise of the upper respiratory organs by breathing and vocal exercises often does great good, and the improvement of the whole bodily muscular tone by properly directed general exercise is here, as in other forms of fibrosis, often singularly beneficial. Climatic change is always, if well directed, of use, sometimes arresting the sclerosis for a long period. A high altitude commonly answers best, and these cases are nearly always worse at the seashore.

Papilloma in Children. In a discussion of this subject J. E. Summers[1] reports three cases in children aged 2 years, 5 years and 15 months, respectively, in which cure resulted after long-continued wearing of a tracheotomy tube. In the first patient thyrotomy was also done twice and the growths cleared out, but as they returned in a few months each time, this method was abandoned. Intubation was also resorted to in the first case, the tracheotomy tube

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(1) New York Medical Journal, Aug. 22, 1903.

being removed after being worn several months. This was also a failure and tracheotomy was again performed. It was possible to permanently remove the tracheotomy tube after 2 years in the first case, 5 months in the other two. From a study of the reports on the subject Summers concludes that the best operation is tracheotomy without any attempt at removal of the growths either by internal or external operation.

L. Harmer[1] after discussion of the various methods of treatment of *papilloma in children* concludes that laryngotomy should be avoided because of the danger attending it and the disastrous results to the voice. Besides there is danger that inflammatory growths about the anterior commissure may cause a stenosis of the larynx. Several methods for removing the tumor by operation through the mouth have been advised and although they present numerous difficulties and no one operation is applicable to all cases, they are sometimes successful. Tracheotomy is a good substitute for laryngofissure or laryngotomy. If, however, a thorough extirpation of the papilloma is determined on the preferable operation is a subhyoid pharyngotomy.

Subglottic Tumors. R. H. Johnston[2] remarks on the rarity of growths in this location and reports two cases seen by him. The usual location of these tumors is on the anterior wall, which was the location of both the author's cases. The first was in a woman of 32, who was in good health, but had suffered from hoarseness followed by aphonia for two years. The growth was a papilloma about 1/3 inch long by ¼ inch broad. It was removed under cocain with complete relief of symptoms. The second case was that of a girl of 15 years. This tumor was also a papilloma and removal was accomplished by the same method. In neither case was there any marked dyspnea although the tumor projected up between the cords.

Cancer. The Editor has thought it well to present the subject of cancer of the larynx quite fully because of the hopeless prognosis usually given in these cases. The cases present themselves to the general practitioner first and it is very desirable that it be understood that cancer in this

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(1) Archiv für Laryngologie, B. xiv, H. 1.
(2) Laryngoscope, October, 1903.

locality is perhaps the most easily cured of any form if an early operation be done. There is so little glandular infection in intrinsic laryngeal cancer that it is very easy in the beginning to remove every trace of diseased tissue. The operation of thyrotomy, a simple splitting of the larynx for removal of the diseased interior, is almost without danger in the hands of a skilled operator and as a rule leaves the patient with a fair voice. Any case of hoarseness coming on after the age of 45 and persisting for three months under favorable conditions, should be subjected to careful laryngeal examination regardless of the presence or absence of pain or other symptoms.

J. Wright[1] believes that the evidence is practically all against the conversion of benign into malign growths by operation. He says: "Extirpation may unmask a preexisting malignancy, but I consider it extremely doubtful if it hastens the end or jeopardizes in any way the patients' chances."

M. B. Cuneo[2] has studied the *lymphatics of the larynx* with reference to their bearing on diagnosis and treatment. The lymphatics of the larynx are divided into two quite distinct territories by the glottis. Those above the glottis find their outlet in the glands about the angle of the jaw; those below the glottis pass in three principal channels to unite at length in the glands behind the sterno-cleido-mastoid. See Fig. 34.

Cancer of the larynx, especially epithelioma is slow to involve the lymphatics so that the discovery of enlarged glands does not aid in early diagnosis. It may, however, be of assistance in determining which part of the larynx is affected. Fortunately, tumors remain long confined to the supraglottidean portion; invasion of the part below the glottis is relatively rare. Cancer may be confined to one side. In these cases partial extirpation may be successful. More attention should be given to the extirpation of the lymph-glands in operation; in one sided cancer only the glands of one side need be removed.

At the 1903 meeting of the British Medical Association Semon[3] and Glück[3] presented papers on the operative

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(1) Laryngoscope, September, 1903.
(2) Gazette des hôpitaux, Dec. 13, 1902.
(3) Journal Laryngol., Rhinol. and Otol., September, 1903.

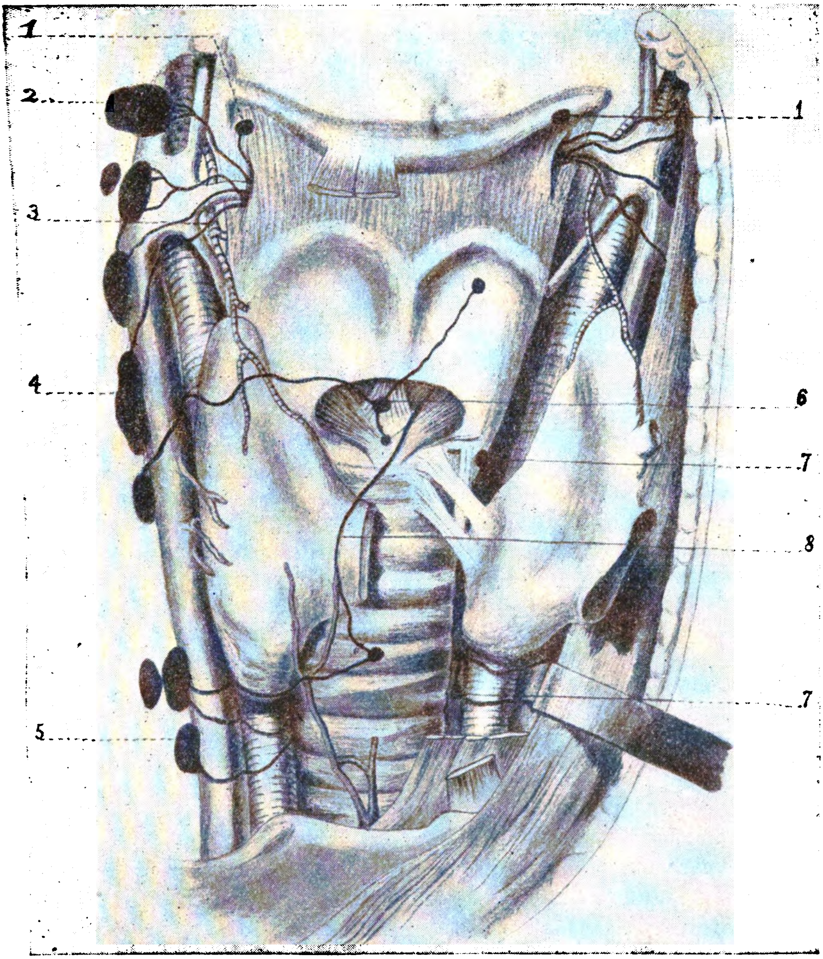

Fig. 34. Lymphatics of the Larynx. 1. Glandular interrupting nodule placed in the course of the collecting vessels of the superior pedicle. 2. Superior gland of the sterno-mastoid chain. 3. Collecting lymph vessel for the superior pedicle. 4. Median gland of the sterno-mastoid chain. 5. Lower gland of the same chain. 6. Prelaryngeal gland. 7, 7. Recurrent glands. 8. Collecting vessel passing to a pretracheal gland.

treatment of cancer. Semon favors thyrotomy in all cases where the diagnosis is made early and reports excellent results. In the year previous to his report he had done the operation twenty times on private patients with but one death from operation and only one (doubtful) recurrence thus far. The operation must be suited to the case and if on opening the larynx, the disease is found to have extended to the hard parts of the larynx these must be removed even to the extent of laryngectomy.

Glück,[1] whose experience with laryngectomy is far greater than that of any other operator, presented this subject with very full details as to technic. He agreed with Semon and practically all other operators, that in early cases of intrinsic laryngeal cancer, thyrotomy is the operation of choice, but in the far more numerous cases in which diagnosis has been delayed until the laryngeal walls have been invaded laryngectomy offers a much better prognosis than has been generally believed.

Glück, since 1888, has performed 125 partial or complete extirpations of the larynx. Of his first 10 cases only 2 were successful and of another series of 9, four died. Since then with increasing experience his results have become constantly better until in his last series of 22 complete laryngectomies he can report 21 recoveries, one patient, a man of 70, dying on the eleventh day of iodoform poisoning. After hemilaryngectomy the patient usually has a good voice, after complete extirpation voice is secured by special apparatus. Of the results as to cure of malignant disease he says, "At present I could show you 38 living patients who have been cured by these operations, the oldest case was operated on 13 years ago. Of those already dead, a number have lived 11, 8, 6½, 5½, 4½ and 3½ years after the operation in good health, and some have died of other illnesses, not of recurrence.

In discussing the papers of Semon and Glück, all of the well known specialists who spoke agreed with the statements of the writers as to the advisability of thyrotomy in early cases and extirpation in later cases in which glandular involvement was not too great.

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(1) British Medical Journal, October 31, 1903.

A laryngectomy for cancer is reported by E. F. Ingals[1] the operation being done by Fenger in February, 1902. The operation was successful as to immediate results but at the time of the report not sufficient time had elapsed to speak of a cure. Ingals says that he would not usually have laryngectomy done for cancer. In all his experience the case here reported is the only one in which laryngectomy seemed justifiable and is the only one on which he has had the operation done.

The patient was a healthy, fine appearing man of 47, in whom the laryngeal disease had lasted 18 months and involved nearly the entire larynx.

In discussing this case N. H. Pierce alluded to an experience of his own illustrating the difficulty of diagnosis of carcinoma of the larynx in its early stages and also the bad results sometimes following endolaryngeal operation in these cases. The patient was a clergyman with a hoarseness of six months' standing. "The laryngeal picture was as follows: On the right cord below its surface was a nodule, pinkish in color, but well defined, with no induration around its base and no redness of the cord, except possibly a slight pinkish color of the upper surface above the growth. It was the size of a small split French pea or even smaller."

The appearance giving no suggestion of malignancy, Pierce as a matter of relief removed the growth through the natural passages. Microscopic examination revealed the cancerous nature of the tissue. Immediately after the operation the case assumed a malignant character. The induration increased so that after five days the entire picture was changed, the hoarseness being greatly increased. External operation was refused and the patient steadily grew worse.

Although endolaryngeal removal of malignant growths where the cancer is confined entirely to the interior of the larynx has been followed by a considerable per cent of cures yet the general feeling among specialists is that it is best not to molest these cases unless a very thorough removal can be done.

B. Fraenkel[2] reports two cases of carcinoma of the

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(1) American Practitioner and Nes, May 1 and 15, 1903.
(2) Annals of Otol., Rhinol. and Laryngol., March, 1903.

larynx developing in individuals in whom a *pachydermia laryngis* already existed. In the first the tumor was removed endolaryngeally but speedy recurrence took place. Six weeks later laryngofissure was done and the affected cord removed. The patient was well when last seen four years later.

In the other patient, a man of 64, a similar condition existed and the same operation was done. Two years later he died of cancer of the colon. There was no recurrence in the larynx. In this case the cancer in the colon was found to be primary, illustrating the very rare condition in which one person is attacked by two separate carcinomas.

Fraenkel speaks of the necessity for early diagnosis in these cases and alludes to the fact that the disappearance or diminution of a tumor under potassium iodid is not always pathognomonic of syphilis since carcinoma may for a time improve under the use of iodids.

E. S. Yonge[1] records two cases of early cancer of the larynx in which he did laryngotomy with success, there being no return of the disease one year after operation. In one case tracheotomy was first done and a week later the larynx was opened by splitting the thyroid cartilage in the middle line. In the other, both operations were done at the same time. The new growth was thoroughly cleared out. Both patients had better voice than before operation. It will be remembered that Sir Felix Semon claims 90 per cent of cures from thyrotomy in early cancer.

W. F. Mercer[2] also reports a successful thyrotomy for a primary intrinsic sarcoma of the larynx in a man of 57. The report was made only a few months after operation and permanent results are of course uncertain.

W. Scheppegrell[3] reports a case of cancer in a man of 57 which was cured by the x-ray. The growth was ulcerated and of size sufficient to impede respiration. With the face and chest protected by a specially prepared paraffin paper the rays were projected directly through the

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(1) Lancet, Nov. 15, 1902.
(2) Virginia Medical Semi-Monthly, Dec. 12, 1903.
(3) Journal of Laryngol., Rhinol. and Otol., February, 1903.

skin and thyroid cartilage with the platinum reflector fifteen inches from the neck. The distance was afterward reduced to seven inches. The exposure was for ten minutes and treatments were given daily for twenty days. At the twentieth treatment congestion was more marked and the tumor showed no diminution in size. Treatment was now suspended for ten days, the outlook being very discouraging. At the end of the ten days the larynx showed an almost incredible improvement and treatment was again resumed and continued for ten days, at which time the ulceration was entirely healed. The report is made four months after cure seemed complete and while it is too early to judge of the permanent results, yet there is very good reason to hope that the cure may be permanent.

D. B. Delavan[1], in a report made May 28, 1902, states that to the best of his knowledge up to that date not a single case of carcinoma of the larynx had been reported as cured by the x-ray. Some have shown improvement. He believes that all inoperable cases should be allowed the benefit of its use. In early cases no harm can result from a short course of x-ray treatment, as the beneficial effects are soon manifest if they occur and operation may be resorted to if there is no improvement.

In a discussion[2] before the American Laryngological Association on the use of the x-ray in deep-seated cancer of the nose or throat, Bliss, Delavan, Gleitsmann, Swain, Coolidge, Birkett, and Simpson agreed that in their experience they had had no encouraging results.

Intubation of the Larynx. The following are L. Fischer's[3] conclusions from 10 hospital cases and 25 cases in private practice:

"1. All the children of these statistics who recovered were breast-fed. This form of nourishment must be credited with great influence in the development of muscles and bones.

"2. We found no chronic cough which could be attributed to the wearing of the tube.

"In the beginning of my investigation, I assumed that I would find a series of cases of chronic laryngitis, chronic

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(1) Laryngoscope, December, 1902.
(2) Boston Medical and Surgical Journal, July 30, 1903.
(3) Archiv für Laryngologie, B. xiv, H. 3.

tracheitis, and chronic bronchitis, which could be referred to the intubation.

"As we know that the pressure of the tube often causes decubitus it might be assumed that an inflammatory process might be induced by the wearing of the tube.

"If we compare a number of children who have never had intubation performed with the same number of intubated children, of the same age and degree of development, we find that the first series suffer in the same proportion from pneumonia and other infectious diseases as the children of my series. This speaks strongly in favor of intubation and teaches two important facts:

"First, The tolerance of the larynx for the tube. One of my cases wore such a tube 26 days, another 30 days. Second, a well-fitting rubber tube in no case causes chronic inflammation which can be attributed to the wearing of the tube.

"3. In every one of my cases I investigated most exactly the question whether the catarrh was due to the wearing of the tube and received in each case a negative answer.

"4. So far as the development of the lungs and chest are concerned, although a large number of children were found rachitic, there was no deformity of the chest which could be attributed to insufficient oxygenation (in consequence of the wearing of the tube).

"5. A much more important etiologic factor is that in 90 per cent of the first series of my cases, chronic diseases of the throat such as hypertrophied tonsils, chronic pharyngitis, or adenoid vegetation were found. In many cases all these pathologic changes were present.

"6. We are, therefore, justified in assuming that chronic throat diseases make the infection easier, and, I believe, stand in an etiologic relation to it. If the throat of a child is in a normal condition the possibility of infection is reduced to a minimum. It must be our task to endeavor to secure normal conditions and if possible to prevent the infection with diphtheria, which is surely a serious disease."

F. E. Waxham,[1] who is a recognized authority on the subject, takes up again the question of intubation particu-

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(1) Colorado Medical Journal, September, 1903.

larly with reference to the kind of instruments best adapted for the operation. He maintains that the original O'Dwyer set is the only one that should be used, as the instruments as finally perfected by O'Dwyer were perfect in every detail. He objects to the French instruments both as to introducer and tubes. The introducer he asserts has too long a beak to be used in children either as an introducer or extractor. The tubes are not properly proportioned, the bulbous point being usually too large and improperly beveled, while the crater-like opening in the head is no advantage in extracting. Since the general use of antitoxin, intubation is becoming less and less necessary and in fact is rarely required when antitoxin has been used early. With antitoxin to check the downward extension of the membrane while the tube prevents suffocation the mortality in intubation has fallen to a very small per cent. In pre-antitoxin days the best results Waxham could obtain showed a mortality of 65 per cent, while with antitoxin his last 121 cases have given a mortality of only 16 per cent.

[Undoubtedly in the hands of the expert the original O'Dwyer instruments leave little to be desired, but comparatively few intubations are done by the expert. By far the greater number if done at all must be done by the man in general work whose experience is limited to one or two cases a year. This being the case the needs of the occasional operator must be considered as much as, indeed, more than, those of the one of great skill. With the O'Dwyer tube the difference of a second or two in the time of inserting the tube and removing the obturator often means the difference of life and death to the exhausted little sufferer since breathing must stop from the moment the tube engages the glottis until the obturator is removed. On the other hand, with the French instrument and tube the breathing is not totally interrupted when the glottis is engaged, so that the loss of a second or two in the hands of the unskilled operator is not so disastrous. On the other hand, in extracting the tube the Ferroud extractor is perhaps a more dangerous instrument because of the greater spread of the blades and the possibility of damage if improperly used. The crater-like opening is, however, of assistance in guiding the beak into the lumen of the tube.—Ed.]

Trumpp[1] presents the advantages of elastic tubes for intubation. The tubes are made of flexible rubber and are shaped much like the O'Dwyer tubes. The advantages claimed are ease of introduction and comfort in wearing, with less liability to production of pressure ulceration.

TRACHEA.

Intratracheal Injections. This method of treatment does not seem to gain the following that the reports of its enthusiastic supporters would seem to warrant. E. A. Forsyth[2] quotes from the reports of others and relates his own experience: He finds the injections to be well tolerated and says the results have been so encouraging that he now uses the method in preference to any other in cases of laryngeal and pulmonary tuberculosis. He uses a solution of menthol, 36 to 70 grains, guaiacol 2 to 15 grains, in benzoinol or albolene, one ounce. Five to ten grains of europhen may be substituted for the guaiacol. Of the mixture, 1 to 4 drams may be used. He cites some severe cases to illustrate the results attained.

Colin Campbell[3] has had an experience of twelve years in intratracheal medication and is an enthusiastic advocate of the method. He prefers a 5 per cent mixture of Izal in glycerin or in gelatin solution, of which he injects as much as one ounce. This mixes intimately with the dense sputum and greatly assists in its removal.

Stenosis. A. Strubell[4] reviews the subject of syphilitic stenosis of the larynx. He concludes as follows: A review of the pertinent literature confirms us in the opinion that tracheotomy should be studiously avoided in cases of syphilitic stenosis of the trachea and in its place resort should be had to well timed dilatation as a rule. The prognosis is then not brilliant but it at any

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(1) Münchener medicinische Wochenschrift, March 31, 1903.
(2) Buffalo Medical Journal, October, 1902.
(3) British Medical Journal, Oct. 18, 1902.
(4) Muenchener medicinische Wochenschrift, Nov. 4, 1902.

rate spares the strength of the patient and saves him from dangers which cannot be foreseen.

Cancer. Wright[1] calls attention to the relatively greater frequency of sarcoma of the trachea as compared with the larynx. He quotes M. Schmidt as having observed 75 cases of laryngeal carcinoma and only 3 of sarcoma. Further, he calls attention to Killian's contention that the reason incomplete eradication of apparent sarcoma of the larynx so frequently results in cure is that the tumor is really not sarcoma. Killian describes a case of his own in which the appearance both macroscopic and microscopic, was that of sarcoma and yet his clinical judgment inclined him to the belief that the growth was not malignant, a belief which was justified by the subsequent history of the case. Wright insists that all these points must be kept in mind in forming an opinion of the efficacy of the various vaunted methods of cancer therapy. He says the toxins, ligation of nutrient vessels, radiotherapy, all find their triumphs in the sarcomata, and their optimistic advocates reserve judgment as to the cure of carcinoma.

BRONCHI.

Foreign Body. M. Hajek[2] reports the removal of a large foreign body from the right bronchial tube by means of Killian's method of bronchoscopy. The patient, a man of 43, suffered from syphilitic contraction of the glottis, necessitating tracheotomy. Dilatation was undertaken by means of Schroetter's tubes. The tube, with string attached, was left in for several hours at a time and finally for three or four days, to be removed by the patient. On one occasion the string broke and next day when the patient returned to Hajek the tube had disappeared. Removal was attempted by laryngo-fissure, but the tube was not found. It was then located by means of the x-ray and removal accomplished by Killian's straight bronchoscope used through the tracheal opening under cocain anesthesia.

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(1) Laryngoscope, September, 1903.
(2) Archiv für Laryngologie u. Rhinologie, B. 14, H. 3, 1903.

HAY FEVER.

The recommendation of H. H. Curtis a few years ago that an extract of rag-weed be administered to hay fever patients for one or two weeks before the time of their annual attack with a view to immunization against at least one of the causes of the disease was a decided advance along the right line of attack. While in only a moderate number of patients was the treatment found of value yet Curtis' discovery was potent in its suggestiveness. Recently W. P. Dunbar[1] has been making investigations on this subject and announces that he has found the exciting cause of hay fever in the pollen of certain grasses (corn, wheat, rye, barley, rice and other graminous vegetables). He has isolated the toxin and has obtained an antitoxin by injecting horses. The detailed account of his investigations is very interesting and seems to warrant most of his conclusions. Sir Felix Semon received some of the toxin and antitoxin from Dunbar and after careful experimentation arrives at the following conclusions[2]:

"1. There can be no doubt that Professor Dunbar has succeeded in extracting from the pollen of certain grasses, a toxin which, when instilled into the eyes or nostrils of people predisposed to hay fever, produces in these parts the characteristic subjective and objective symptoms of the disease.

"2. The toxin, when injected into the eyes or nostrils of people not predisposed, produces, in the great majority of cases, no symptoms whatsoever.

"3. The effects of the toxin in people suffering from hay fever are as variable in intensity as are the attacks of the affection itself, both with regard to the local and constitutional symptoms.

"4. Professor Dunbar's antitoxin certainly produces immediate disappearance of the subjective, and after a few minutes, great amelioration of the objective symptoms.

"5. The mixture in equal parts of a toxic solution (1

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(1) Muenchener med. Woch., 1903.
(2) British Medical Journal, March 28, 1903.

in 500) and the antitoxin serum suffices to neutralize the specific effects of the toxin.

"6. The effects of the antitoxin appear in some instances to be sufficient to prevent a reappearance of the subjective symptoms, whilst in other instances repeated instillations of the antitoxin were required to produce ultimately the return to normal conditions."

Semon finally concludes: "I know I am in perfect accord with the original investigator in giving this strong warning against premature hopes which ultimately may not be fulfilled. At the same time, I think there cannot be any doubt that Professor Dunbar has made a very interesting and important discovery, which, it may be devoutly hoped, in the interests of many thousands of sufferers, will ultimately lead to the development of an effectual specific treatment of this very troublesome affection. He has most kindly promised to keep me *au courant* of his further experiments, and I too hope to continue my own researches. When anything new can be reported I hope to return to the subject."

In a later communication[1] Semon gives his further experiences with Dunbar's antitoxin and says: "To sum up I can unfortunately not say that the remedy has in any sense acted as a panacea in any of my cases. It has given relief in some, and appears to have acted beneficially certainly in postponing the occurrence of the attack in others of my patients. Possibly these effects might have been even more marked had the applications been made with even greater frequency. I ought also to say here that according to the spontaneous statements of at least two of my patients it appears to have had the effect of making the present hay fever period altogether a good deal more tolerable than on previous occasions."

The hypodermic injection of the antitoxin has been found to have such unpleasant results, such as swelling of the entire arm injected, with heat, redness and itching, lasting in some cases six days, that Dunbar advises against its use by this method. These unpleasant results from injection are not seen in persons not subject to hay fever, which would thus seem to indicate that the serum as thus

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(1) British Medical Journal, July 18, 1903.

far produced is not quite free from specific toxic properties to which hay fever patients are very susceptible.

P. McBride[1] from a trial of Dunbar's antitoxin reaches about the same conclusions as Semon.

Some of Dunbar's toxin and antitoxin was sent to E. Mayer of New York who reports[2] that he found the toxin to cause a typical reaction and the antitoxin to be an antidote therefor in persons who suffered from hay fever in May, June and July. On the other hand, the toxin and antitoxin had no effect on the August and September sufferers. He therefore concludes that the toxin discovered by Dunbar is that which causes the vernal variety of hay fever in America, but that the toxin causing the autumnal variety is yet to be discovered.

Dunbar's antitoxin has now been tested on the late summer and autumnal variety of hay fever and reports are beginning to appear on the results. A. W. MacCoy[3] tested the antitoxin in fifteen cases in private practice. His experience, like that of others, shows that the public allows great latitude in its classification of hay fever. Many cases presenting as hay fever were in no sense periodic in the summer months only, and not a few were composite or mixed cases, such as nasal polypi, nasal asthma, and chronic vasomotor rhinitis. Eliminating all but purely periodical autumnal attacks MacCoy used the antitoxin as follows: To the conjunctival mucous membrane one or two drops were instilled from two to four times a day; for the nasal passages, from two to four drops were dropped in each nostril from two to six times a day.

Detailed accounts of the treatment of six cases are given and the following conclusions reached:

"In the fifteen cases in which I made my clinical experiments, the effect was so promptly manifested, the relief so complete, and the result so permanent for this season, that it appears really marvelous! We have all heretofore experienced such deep disappointment in our trials of various methods of cure—surgical and medicinal—that the writer was, to say the least, not enthusiastic concerning results, but he can truthfully say that he be-

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(1) Edinburgh Medical Journal, July, 1903.
(2) New York Medical Journal, Aug. 8, 1903.
(3) New York Medical Journal, Nov. 21, 1903.

lieves that no such advances have ever yet been made in the treatment of hay fever. It remains to be determined whether there are in America some cases of hay fever not amenable to cure by the use of the antitoxin serum of Dunbar. So far as my fifteen cases can illustrate they appear to confirm the contention of Professor Dunbar, that cases of hay fever are dependent upon the toxin resident in the various pollens of *grasses.* It is interesting and noteworthy that the experiments of Professor Dunbar open up a new field, this being, so far as I am aware, the first instance of the production of an antitoxin serum or fluid where the animal product has been crossed with a vegetable product."

F. E. Stowell[1], himself a sufferer from the vernal form of hay fever, suggests from careful observation of his own case that it is the sun's rays that excite the attacks. Acting on this theory he wore colored glasses and was immediately relieved.

D. B. Kyle[2] presents a very thoughtful article on the *import of the salivary and nasal secretions in hay fever.* After making a series of examinations of the saliva in certain individuals afflicted with hay fever and those not afflicted with the disease he is of the opinion that in many cases the local irritation in the nasal mucous membrane is brought about by some chemic change in the constituents of the secretion of the mucous-secreting glands. Sensitive areas within the nasal cavity or irregularities of formation of the cavities are factors in some cases; yet such areas or irregularities instead of being etiologic factors, are merely more susceptible to the irritant from within. Certain individuals will have at any time in the year an attack which is quite similar to hay fever. In many such persons the saliva and nasal secretions have been found to contain an excess of sulphocyanids and ammonium salts. On exposure to air there is liberated free ammonia which he believes to be in many cases the cause of the attack. In answer to the question, "Why does hay fever come on at certain times of the year?" it may be answered that climatic and atmospheric conditions

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(1) **New York Medical Journal, Sept. 5, 1903.**
(2) **Laryngoscope, September, 1903.**

produce change in function and secretion, making individuals more susceptible to disease. As to the effect of pollen in certain cases it is quite possible that owing to some peculiar constituent of the secretion of the mucous gland, there is deposited in or on the nasal mucous membrane certain materials which, when brought in contact with certain extraneous materials as pollen, through some chemic action produces a material which brings about the irritation and causes an attack of what is known as hay fever; or it is possible the extraneous material merely acts as a stimulant to the mucous glands and causes à flow of mucus, which, owing to its altered chemistry, acts as an irritant.

Kyle very aptly says: "I think if we would give more attention to the secretions we would find less occasion to do certain surgical operations on the nose."

MISCELLANEOUS.

J. E. Schadle[1] has presented in a very instructive paper the relationship between diseases of the nose and throat and general diseases. The recognition of this relationship is essential to the proper management of either class of diseases, yet in spite of much writing and teaching on the subject the specialist is too likely to overlook general conditions and the internist to overlook local disturbances. A child with persistent fever and apparent systemic disease may be found to have a subacute inflammation of the pharyngeal tonsil as in a case cited by Schadle.

An adult with persistent or frequently recurring nasal obstruction in which operative procedures seem necessary may be cured by attention to the liver and kidneys with a view to relieving the blood of some of its retained waste. Gastric disorder of apparently serious character may be found to be due to long continued swallowing of purulent secretions from the nose or accessory cavities. Constitutional syphilis in apparently robust individuals may be responsible for nasal obstruction through gummata. Rheu-

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(1) St. Paul Medical Journal, August, 1903.

matism or gout may be the underlying factor in some "catarrhal" cases. In fact, almost every constitutional disease may have some manifestations in the nose or throat and the diagnosis should be determined only after thorough consideration of the entire picture.

In a discussion of the *relation of nasal disease to pulmonary disease* E. L. Shurly[1] concludes that the former is in no special degree concerned in the development of chronic pulmonary disease, but that it does bear a very distinct etiologic relation to acute diseases of the lungs.

Mouth Breathing at Night. S. W. Tufts[2] made an investigation of the subject and found that the number of persons who breathe through the mouth when asleep, although nose-breathers when awake, is much larger than is ordinarily supposed. In 19 entire families comprising a total of 84 persons, 70 per cent were found to breathe through the mouth at night. Many persons who strongly insist that they breathe through the nose when asleep will be found, if observed, to be mouth-breathers at night. The importance of this point is scarcely realized. When it is considered how large a proportion of serious diseases from which civilized man suffers is of the respiratory organs, and what an important part the nose plays as a protector to the lower respiratory tract, one will understand how important it is that the individual should always breathe through the nose. Tufts has found that a piece of silk isinglass court-plaster, ⅜ by 1¼ inches, stuck across the closed lips is much more satisfactory and more likely to be used by the patient than any sort of chin cap.

Diagnosis. E. H. Griffin[3] calls attention to the mistakes made in the diagnosis of syphilis, both acquired and hereditary, of the upper respiratory passages. Many cases of syphilitic gumma and ulceration are treated for tuberculosis until irreparable damage is done. If there is a question as to hereditary syphilis the typical Hutchinson's teeth are looked for and if not found the decision is too often against that disease, whereas Hutchinson's teeth are found in only 10 to 15 per cent of cases of hereditary syphilis. A number of cases in children and

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(1) International Medical Magazine, February, 1903.
(2) American Medicine, Jan. 31, 1903.
(3) New York Medical Journal, March 14, 1903.

adults are detailed to illustrate the presence of otherwise typical hereditary syphilis with normal teeth. Iodid of potassium will cure many cases in which the knife has been vainly resorted to.

Lupus of the Nose and Throat. H. B. Christiansen[1] gives an account of the treatment of lupus of the respiratory mucous membranes in the Finsen Light Institute, Copenhagen. Of 1,000 lupus patients with lupus, 75 per cent showed involvement of the mucous membranes. It is very rare for a patient to apply for treatment of lupus of the mucous membranes, nearly always they come on account of the skin disease. In only ten cases has the disease been confined to mucous membranes. As characteristics of lupus of the mucous membranes are mentioned, swelling, deep red color with small nodules of a brighter red and white epithelial scales, frequent presence of miliary tubercles and ulcerations, absence of pain and other subjective symptoms, torpid appearance, and chronicity. The light treatment can be used only in the anterior part of the nose or mouth, the results being almost as good as in the disease of the skin. In the deeper parts of the nose and throat other methods have to be used. Chief of these is the galvano-cautery, the nodule is punctured by the electrode, never circumscribed or scarified. Besides the galvano-cautery, iodin and corrosive sublimate are used. The iodin is used in strong solution,—iodi, 15 grains; potassii iod., 30 grains; aq. dest., 30 minims. Corrosive sublimate is applied on tampons in 1 to 1000 strength, the patients retaining the tampons two hours or more. If the sublimate is too irritating, potassium permanganate 1 to 700 is used in the same way. Lactic acid they have found of no value. In certain cases which are irritated by every kind of vigorous treatment the lupus tissue is covered with the following: Resorcin, balsam of Peru, mucilage of acacia, equal parts. An essential part of the method which is emphasized is the daily clinical treatment, extending over a long period of time. In lupus of the larynx the treatment is, mentholated oil brushed on at the clinic, with menthol inhalations at home.

The freezing treatment has not been found useful.

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(1) **Journal of Laryngology, Rhinology and Otology, Octo**

As illustrating the degree to which lupus of the mucus membranes may extend without the patient's knowledge, W. Wingrave[1] exhibited before the British Laryngological, Rhinological and Otological Society a woman of 23 who had complained for only two months and yet in whom there was ulceration of the nose, and marked infiltration of the soft palate, epiglottis, aryepiglottic folds and vocal cords.

Mucin and its Relation to Malignant Disease. W. Stuart-Low[2] presents a very interesting and suggestive article on the subject of mucin and its relation to malignant disease. He adopts from Wm. Overend the following terms: *Orthomyxia,* a sound and healthy state of the mucous membranes; *metamyxia,* any quantitative change in the secretory powers of the mucous membranes; *hypermyxia,* excessive secretion; *hypomyxia,* diminished secretion; *paramyxia,* a profound qualitative alteration in the secretory powers of the mucous membranes. The author maintains that malignant disease develops most often in those parts where the secretion of mucus is least and in those persons in whom there is hypomyxia. Cancer of the nose and throat develops most frequently in excessive smokers and in these the use of the tobacco brings about a hypomyxia. The same is true of excessive salt users, and the effect of too much salt is to coagulate the mucin and impair the secretion. He claims that in all healthy old people whom he has examined there has been orthomyxia. In the domestic animals, such as the horse, cow and pig, which have abundant secretion of mucus, cancer is very rare, while in the dog and cat with scant mucus the disease is much more common. Six cases of cancer are described, mostly of the nose or throat, in which mucin was used locally as a wash and internally in tablets with great relief of pain and retardation of growth. The author builds up a very interesting theory which will no doubt be investigated further by himself and others. The original article will repay perusal.

Suprarenal Extract. A. Rosenberg[3] reports a case in which the local application of suprarenal extract in the

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(1) Journal Laryngology, Rhinology and Otology, August, 1903.
(2) Annals Otol., Rhinol., Laryngol., November, 1903.
(3) Berliner klinische Woch., Oct. 12, 1903.

nose produced a marked urticaria which came on a few hours after the application and lasted with great intensity for a number of hours. The patient was a girl of 20 and the phenomenon occurred on two different occasions several days apart.

Argyrol. M. D. Lederman[1] recommends applications of 20 to 50 per cent solutions of this salt in acute and chronic pharyngitis and rhinitis.

[The Editor's small experience with this drug led him to abandon it and return to protargol where any stimulating effect was desirable, as in subacute or chronic pharyngitis and laryngitis. The germicidal powers of argyrol are undoubted and its efficiency in acute infections correspondingly positive, but its lack of irritating effect is the very reason for its inefficiency in the chronic inflammations. Nitrate of silver is better than protargol for this very reason, but it is so irritating that the slower protargol is to be preferred.]

ANESTHESIA.

The question of the best anesthetic for short operations on children continues an interesting subject of discussion. While chloroform is generally held to be a safe agent in children, yet the reported cases of deaths from its use are too many to justify this assumption. On the other hand, as stated by Weir (1900) there has been no death reported in children under 12 years old from the use of ether. The odor of ether is, however, so very distasteful and the application of the inhaler so terrifying to children that one often feels justified in dispensing with its use in such operations as tonsillotomy or adenectomy, where it is hardly a question in the mind of the Editor if the mental anguish of the little patient while struggling against the anesthetic is not far worse than the brief physical pain from the operation without anesthesia. The element of mental suffering is almost absent in the latter case as the patient does not know what is to be done until the operation is practically over. For adenectomy alone or tonsillotomy alone nitrous oxid is an ideal agent and al-

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(1) Medical Record, Nov. 22, 1902.

ways to be used when possible in preference to operation without anesthesia. Recently the use of nitrous oxid as a preliminary to the use of ether has gained many adherents, and having in mind the terror and struggles of children when ether is used alone the use of the combined method is most heartily to be recommended. In an article on this subject S. J. Kopetzky[1] says:

"To recapitulate: That to use chloroform is safer than to employ ether with children, is not borne out by close observation, and especially is this true with robust and healthy children. Chloroform is dangerous because an overdose may be too easily given. Cardiac failure may set in at the very beginning of the anæsthesia, because of the violent and dangerous struggle which takes place in frightened children.

"Death occurs suddenly and without warning. The tendency to push the anæsthetic is too tempting. Cardiac syncope following vomiting may occur at any time during or after the administration of chloroform and result fatally.

"When we follow the administration of nitrous oxide with ether, the surgeon has at his command an ideal anæsthetic for children. It combines the rapidity of chloroform without its dangers, with the safety of ether. With its use vomiting is lessened, since the quantity of ether taken in a given case is smaller and consequently the after-effects are correspondingly less, I have seen but two cases of respiratory irregularity in five hundred when this method was resorted to."

A. R. Solenberger[2] advocates the use of bromid of ethyl in tonsil and adenoid operations on children from 1 to 12 years old. There should be a reasonable certainty of the healthiness of the lungs, liver and kidneys. The fact that the child is delicate does not contraindicate its use. Such a child needs simply a smaller dose and will come under anesthesia quicker. The stomach must be empty and the chest unrestricted by the clothing or the arm of the assistant. The following brief rules are given:

1. Do not use bromid of ethylene.

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(1) Medical Record, Oct. 3, 1903.
(2) Journal American Med. Assoc., April 18, 1903.

2. Do not use an old or impure solution.
3. Do not administer it in repeated and small quantities. Give *en masse,* admit no air.
4. Do not continue its administration longer than one minute.

Five grams (1¼ drachms) of the drug is sufficient for children under five years and not to exceed ten grams (2½ drachms) in children from five to twelve years old. The anesthesia lasts from one and a half to two minutes.

T. L. Bennett[1] advocates the use of G. W. Crile's method of administering an anesthetic in operations on the mouth and on antrum or frontal sinus cases. The method is as follows: The patient being fully anesthetized in the usual manner, rather heavy-walled tubes of as large diameter as possible are passed through the nostrils to a point in the pharynx opposite the top of the larynx, whereupon respiration will take place through the tubes. The mouth is now opened, the tongue pulled well forward and the space thus formed at the back of the pharynx is packed tightly with gauze, so as to completely shut off communication between the mouth and nose and the larynx. The free portions of the tubes are carried up over the forehead, the ends covered with gauze, upon which ether or chloroform may be dropped to continue the narcosis. Bennett has found the results satisfactory in every way, the protection of the lower air passages being absolute, the respiration normal and the narcosis perfect. If necessary to leave one nostril free for any reason, a single tube passed through the other nostril will suffice for respiration and the anesthetic.

R. C. Myles[2] prefers *local anesthesia* with cocain in operations on the antrum, sphenoid sinus and ethmoid cells. In removal of the tonsils he uses cocain carefully applied for thirty minutes before operating. In a discussion of Bennett's paper (New York Academy of Medicine, Laryngological Section) the consensus of opinion favored ether in preference to chloroform in nose and throat operations and the use of weaker solutions of cocain than are commonly used. A four or five per cent solution used for a longer period was claimed to be as effective as a stronger

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(1) Laryngoscope, April, 1903.
(2) Laryngoscope, April, 1903.

solution used for a short period. The use of adrenalin with cocain seems to counteract the depressing effects of the latter. Several operators used a combination of cocain and adrenalin for injection into the tonsils, thereby securing a painless and bloodless operation.

[The Editor has been able to use cocain for adenoid operations in children from 7 years and upward with very satisfactory results, the pain of operation being rendered very moderate and in some cases entirely prevented. The method is to twist a very small pledget of cotton on the end of slender probes and pass through the nose on both sides, allowing the probe and pledget to remain for five minutes. Usually two pledgets may be introduced at once on each side. By using *very* small pledgets made quite blunt at the end the cocain is not absorbed anywhere except at the point of contact with tonsil, it is not squeezed out in passing through the nose (inferior meatus and then lifted a little on reaching the pharynx) nor by contraction of the palate. Attempts to anesthetize with cocain by pledgets introduced through the oropharynx have never been satisfactory and are much more dangerous on account of the squeezing out of the cocain by contraction of the palate.]

N. G. Ward[1] has found the administration of atropin, 1-200 to 1-100 grain, a few hours before operations on the nose and throat to be of much value in preventing reflex inhibition. He finds less disturbance from the use of cocain and better anesthesia to result when the atropin is used, while the shock of operation is largely prevented.

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(1) New York Medical Journal, Sept. 12, 1903.

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